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DISEASES OF THE EAR, NOSE AND THROAT IN MAORI CHILDREN

Issued by Medical Statistics Branch
of the Department of Health
Wellington, New Zealand

1965

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DEPARTMENT OF HEALTH

DISEASES OF THE EAR, NOSE AND THROAT IN MAORI CHILDREN

A Survey Conducted in the Waikato Hospital Board District

compiled by

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The opinions expressed in this report are those of the author and do not necessarily represent the views of the Department of Health.

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FOREWORD

The level of health of the Maori people is in many respects significantly poorer than that of the pakeha. The reasons for this are complex and not easy of solution.

Ear diseases afflict too many Maori children. Indeed, discharging ears are often taken by their parents as a normal affliction of childhood - a false and dangerous idea. Neglected discharging ears all too readily lead to permanent impairment of hearing, and to the adverse social consequences which attend deafness.

Treatment of ears of many children over a wide area, particularly for those living in rural areas, is a time consuming business, with results often slow in becoming apparent. This report demonstrates, however, that with patience and much hard work the problem can be tackled - and tackled with success.

Building on the work of Dr Phillips-Turner and his colleagues it is hoped that shortly a service extending to many other parts of the country will be created, to eliminate the present reservoir of suppurating ears. If this is achieved, it will represent a marked advance in raising the level of health of Maori children.

H.B. Turbott.

H.B. Turbott
Director-General of Health
31 December 1964

DISEASES OF THE EAR, NOSE AND THROAT IN MAORI CHILDREN

SECTION 1
INTRODUCTION

1.1 The problem

Over the years some of our hospital and public health authorities, private medical practitioners, education authorities and social workers have admitted to being appalled by the prevalence of various forms of ear, nose and throat disease in the Maori, and in particular among Maori children. For over half a century the "Maori ear" has been regarded in medical practice as a most unrewarding condition to treat in more ways than one, and by both parties concerned.

There is no doubt, however, that the extent and nature of the problem have varied over the years. At one stage it appeared that the Maori, decimated by warfare and disease, was a dying race and his ear, nose and throat problems would die with him; as from a total of 56,049 in 1858 the population fell to only 42,000 in 1896. Nevertheless, from that time onwards it has increased, reaching 186,393 in 1964, the rate of increase today being over 4% per annum. New medical and surgical treatments of other diseases have produced results bordering on the miraculous when compared with those of only twenty years ago and the same may be said of treatment for acute ear disease. Also, due probably as much to better communications, hygiene and education as to any attenuation of virulence of the infecting organism, the complications of neglected ear conditions which were a cause of death thirty years ago are rarely found today and medical officers of health in both Hamilton and Rotorua have remarked on the improvement in the general situation for these diseases in their area. With chronic ear disease, however, the picture is not so very different from what it has always been, whether the patient be Maori or Pakeha; for it will be stressed more than once in this report that organisms causing diseases of the ear do not choose their hosts by the colour of their skins but are encouraged to develop by a person's disregard for the ordinary principles of hygiene and reluctance to seek treatment at an early stage.

1.2 Reasons why a survey had not previously been attempted

While there has been a general awareness of the necessity for an examination of this unsatisfactory state of affairs, no large scale attempt has ever before been made to do anything about it, for the following reasons:-

(a) A thorough investigation could not be carried out by any individual private practitioner, nor even by a group of private practitioners, without the active participation of the Department of Health, the Education Department and the Hospital Board in the area concerned. It would have been doomed to failure without the goodwill and help of the medical profession in this area.

(b) Such an investigation was far too big to be carried out in anybody's spare time.

(c) The basic facts, expressed in the simplest statistics of numbers, had never been available. Any knowledge that did exist was in the minds of various specialists and had never been "pooled" and then built on for the common good. Consequently, although the problem could be stated in general terms, it was impossible to define what constituted the real kernel of it, and to suggest a remedy at that stage would have been merely to base one uncertainty on another. A statement attributed to Lord Kelvin sums up the position in one sentence, even although it was written many years ago. "If you can measure that of which you speak and can express it by a number, you know something of your subject, but if you cannot measure it your knowledge is meagre and unsatisfactory".

(d) As far as is known no otologist had ever been given the chance to make such a survey with the resources and co-operation previously mentioned. Perhaps no otologist had felt a compelling desire to conduct such a survey.

1.3 The urgent need for a survey

The urgent need for investigation and the application of any possible remedial measures was strongly indicated by the "Hunn Report"*, which states, inter alia:

(a) Whether we like it or not, integration of the Maori and Pakeha is occurring now and will occur at an increasing rate in the future.

(b) Because of the differential birth rate between the two races the actual and the relative number of Maoris is increasing more and more rapidly.

While the problem as it exists today does concern us, we are acutely apprehensive about what it could be in twenty years' time if the present unsatisfactory medical situation regarding treatment of ear, nose and throat disease continues and if the above forecast proves correct.

In 1972, only a few years away, there will be 241,000 Maoris out of a total New Zealand population of 3,026,000; but those Pakehas who see the year 2000 will share New Zealand with 703,000 Maoris when the total New Zealand population will be 4,781,000. The effect on the Maori school child population is forecast as follows:-

Number of Children of School Age (5 to 15 years) 1930-1972

Year	Maori	Non-Maori
1930	17,880	266,060
1940	25,330	246,660
1950	31,550	301,000
1962	49,100	443,600
1967	57,100	
1972	69,850	

72% of these children will reside in the Auckland Province.

If future generations of Maori school children retain their greater susceptibility to ear disease, every year that passes will add to the size of the problem until it may become too big ever to be solved. A change in the habits and philosophy of the Maori of the future is not unlikely but this will be gradual rather than dramatic.

Two factors could materially alter this somewhat gloomy outlook (from the ear, nose and throat point of view):-

(a) The urban drift Under this title the Hunn Report shows that for economic reasons the urban to rural Maori ratio must eventually parallel the Pakeha, which is now two urban to one rural (at the moment there are three rural Maoris for every one urban). It will be shown in this survey that the need for a special service exists in the rural areas, as the urban Maori can already obtain treatment, and it is in the future rural Maori that the problem will lie. However, the explosive increase in the general Maori population may be so modified by the urban drift that, from the point of view of the rural Maori ear, nose and throat service, there may be little change in the numbers involved in the near future. Nevertheless these numbers are quite big enough.

(b) The "contraceptive pill" These forecasts of population were made before the possible effects of the "contraceptive pill" could be considered. The taking of these pills appears to be extending among married Maori women of childbearing age; from discreet and quite extensive enquiries it is thought that an appreciable proportion of women in this area is using them more or less regularly. As the average parity of Maori women is approximately eight, one can appreciate their desire for a family of more manageable size. It is quite impossible at present to estimate the effect of the pill on the future population.

*Hunn, J.K., 1960, "Report on Department of Maori Affairs", Government Printer.

1.4 Initiation of the survey

In 1961, at the request of the Services for the Deaf Committee of the Board of Health, the writer submitted suggestions to the Committee as to how a survey of ear, nose and throat disease in Maori school children of the Waikato Hospital Board area, and a clinical service for such children, might be instituted. The suggestions were accepted and the Committee resolved, inter alia, "that a request should be directed to the Waikato Hospital Board from the Committee asking that the scheme as propounded by Mr. Phillips - Turner be initiated under his immediate control". It was further resolved that the Committee, as a co-ordinating body, should exercise general oversight of the scheme. This provided for the introduction of a pilot service which would be the means of collecting statistics to show the extent and the nature of the problem, and in addition permit a clinical service to evolve as was found best by the circumstances moulding it. It was hoped that a study of the data of the first, and the administrative and clinical experiences of the second, would not only be of immediate value to the Waikato Hospital Board but would also form a basis on which to build a national plan for the attack on ear, nose and throat disease in the Maori, should the disclosed circumstances warrant it.

1.5 Choice of Waikato Hospital Board area for the survey

The advantages in choosing the Waikato Hospital Board area, rather than any other, for this survey were:-

(a) More Maoris were domiciled there than in any other hospital board's area.

(b) The Board itself was particularly keen to have such a survey attempted. The problem was an obvious one among the large numbers of Maoris in Ngaruawahia, Te Kuiti, Taupo and in Rotorua particularly.

(c) Laboratories and special services available at the Waikato and Rotorua hospitals were centrally placed as regards Maori population; public health nurses were already situated in strategic areas from that aspect and there was a District Nursing Service to help with the treatment of affected children when necessary.

(d) Clinical ear, nose and throat specialist service was available. When Dr.Marien L.Miller was appointed a full time ear, nose and throat specialist to the ear, nose and throat department at the Waikato Hospital it had already been agreed in principle that part of her duty would be that which she has actually carried out during this survey.

As the Maori population of the Waikato Hospital Board area was 32,760* in 1959 it was realised that the survey could be based on part of the population only. The Maori school child was the obvious choice - he was the one to whom lack of treatment would cause the greatest damage, or by corollary to whom effective treatment would do the greatest good. Being at school he had a regular medical inspection and there was the chance of giving him regular treatment. He could conveniently be brought to a centre for examination without economic loss to the family and he made up almost half the Maori population. For all these reasons this report is based on Maori school children living in the Waikato Hospital Board area who were found by school medical officers to be suffering from ear, nose and throat diseases.

1.6 General method of the survey

The survey had to evolve in the light of day to day experience as there appeared to be no pre-existing pattern that could be adopted and remoulded to suit present day requirements. It commenced with a search into the literature to find out what New Zealand studies were available and although much work had been done on Maori health there was little in a sufficiently specialised form to obviate the necessity for the otological examination of a large number of Maori school children, and a description of their social and physical environment.**

* "Annual Report on the Medical Statistics of New Zealand for the Year 1959", Table 4, Government Printer.

** Those interested in a detailed history of the measures taken to improve Maori health over the last sixty years are referred to the story of how much was done by so few with such meagre resources as told by F.S.MacLean, 1964, "Challenge for Health", p.189-222, Government Printer.

1.6 General method of the survey (cont'd)

The death rate, which can be a fairly reliable guide to the incidence and prevalence of most diseases in the Maori* is of little help in the type of disease we are considering; nor indeed does the number of admissions to public hospitals prove of value seeing that admission to hospital is unusual in these cases. The need for this detailed study of the Maori at least had the virtue of making the survey team dependent to a large degree on its own observations and where knowledge gained was not of immediate practical value it could be regarded as adding to a stockpile of information for the use of future investigators.

1.7 Emphasis on disease of the ear

It should be explained why, in dealing with ear, nose and throat diseases, so great an emphasis has been put on those of the ear, rather than of the nose or throat; indeed the impression may be created that the importance of these latter diseases exists only insofar as they may modify or cause the ear disease. This indeed is true, for it was found almost without exception that the reason for reference of the patient was discharge from the ear, deafness or both (see notes on statistical survey). Deafness is frequently an end result of these conditions and is often more obvious than the poor general health which may accompany it; if permanent, it may become a source of economic loss to the individual and to the community.

Education authorities are naturally very concerned with deafness in the children for whose education they are responsible. Mild degrees have a certain nuisance value at school; severe degrees may necessitate the use of hearing aids and the provision of special help there; profound deafness, if congenital or acquired at an early age, necessitates education in special institutions or special classes. Any child whose hearing can be "saved" also saves the State a considerable amount of money.

Although it is true that the majority of children in say, the Kelston School for the Deaf, suffer from a form of deafness that could not have been avoided, there is reason to believe that some of the Maori children are there because of deafness that could have been mitigated to some degree. In September, 1961, there were 84 European children at the school. On a population basis there should have been less than 10 Maori children, but in fact there were 80; and while it is not suggested that the deafness in 70 of these Maoris was avoidable it is fairly certain that there must be explanations for this discrepancy.

In January, 1963, the Principal of the School, Dr.D.M.C.Dale, and Mr.A.C.Miller, F.R.C.S., Consulting Otologist, analysed the causes of the deafness of the 18 Maori children there whose homes were in the Waikato Hospital Board district. In 5 cases the deafness was unavoidable being due to conditions such as forms of encephalitis and meningitis, etc. In a further 5 cases the deafness was due in part, at any rate, to suppurative conditions of the ear. In 8 cases the cause was unexplained.

It is from the second group that a plan for more efficient treatment of Maori children might have snatched at least one brand from the burning and if the same yardstick could be applied to the Maori children from other hospital board areas one feels that the hearing of at least four more could have been saved by a service on a national scale. As it is probably fair to say that any child who has to be educated at a school for the deaf will cost the taxpayer £400 more per year than he would if educated at an ordinary school, it appears that £2,000 p.a. could have been saved if the deafness in these five children had been avoided.

* R.J. Rose, 1960, "Maori-European Standards of Health", Department of Health Special Report Series No. 1, p. 3.

1.8 The special need for an ear, nose and throat service rather than any other

During the survey it became apparent that an estimated 4,886 rural Maori schoolchildren in the Waikato Hospital Board's area (this may be an under rather than an overstatement) because of their isolated habitation, had little chance of treatment for their ear, nose and throat diseases. It is therefore considered that they should be given a special service. It might appear, however, that if a special service for these children is required for ear, nose and throat disease, a complete service for all diseases might also be required. Such a question is quite beyond the scope of this report, but the overall improvement in the general health of the Maori population is well shown in a chapter devoted to it in "Challenge for Health" by F.S.MacLean, 1964, Government Printer p. 189-222. Nevertheless, it appears necessary to state the special claims for a service for ear, nose and throat disease. They are as follows:-

(a) As a rule these diseases do not cause an illness that the parents consider serious, and they are therefore apt not to seek treatment.

(b) These diseases are extremely common, and as they are inclined to be recurrent, familiarity breeds contempt in the parents' minds.

(c) As the ear drum is invisible except to special methods of examination, in the absence of aural discharge or gross deafness parents may be genuinely unaware of the presence of disease.

(d) Treatment, to be effective, may need to be carried out daily for considerable periods.

(e) Treatment is carried out for cavities, the walls of which are largely invisible to the parents. A special technique is necessary if treatment is to be adequate and if it is not properly done it is usually just a waste of time.

1.9 The children

To furnish a statistical report on diseases of the ear, nose and throat in Maori school children without much reference to the children themselves, their surroundings and habits, would be like describing a disease and forgetting to describe the patient suffering from it. These matters are amplified in "The Human Material"

1.10 Report on the survey

The present report, therefore, is the outcome of the resolution of the Services for the Deaf Committee of the Board of Health; it states the objects of the survey and shows how they were achieved and to what degree. It describes the service instituted in the Waikato Hospital Board area, and attempts to gauge by comparison the probable size of the problem in other districts. It provides certain data which will be of help to the Committee in assessing whether it is practicable or advisable to extend a similar service to other areas in New Zealand. Although some of the factors involved are non-medical, it is thought that equal attention should be drawn to them as to the purely medical ones. It has been our experience that transport can govern treatment and petrol can be just as important as penicillin.

Much has been included which may, at first sight, appear to be irrelevant; but it is hoped that this report will be read by many who have an interest in the health of the Maori school child from diverse aspects and there appears to be much common ground here between hospital board members and sociologists as well as those interested in education on the one hand, and medical administrators and practising doctors on the other. As it is also hoped that the report will stimulate research in many of the problems uncovered by it, which this survey has had to pass over to avoid dissipation of effort, references have been made to the published works of others that seemed most to the point and likely to help future investigators.

SECTION 2

THE OBJECTS OF THE SURVEY

2.1 The establishment of an ear, nose and throat specialist service

The setting up of an ear, nose and throat specialist service at Hamilton and Rotorua to give the most efficient, yet practical assistance possible to those children who, from geographical or other reasons, were likely to get no treatment otherwise.

2.2 The statistical analysis

The recording of the medical conditions discovered and the making of a statistical survey:

(a) To determine the nature and incidence of such diseases.

(b) To investigate any possible cause of diseases.

(c) To evaluate the effect of various forms of treatment.

(d) To assess the probable end result of disease in terms of disablement and economic loss to the country.

2.3 Further investigations

The collection of references to the work of others where this could be of help to future investigators.

The indication of subjects requiring further research.

The gaining of experience in the solution of the administrative as well as the medical problems involved.

2.4 Assessment of the clinical problem

The presentation of a report indicating what fraction of the total clinical problem had been satisfactorily dealt with in this area. The provision of sufficiently full and accurate information to enable the Committee to form a true picture, by inference, of the national extent of these diseases and to enable it to make a fair assessment of the benefit that such a service could give compared with the effort and expense involved.

SECTION 3

THE METHOD OF THE SURVEY

3.1 The detection of disease

This lies within the province of a medical officer of the Health Department. When he makes a periodical examination of school children all the Maori children with abnormalities of the ear, nose and throat are referred to the special Maori ear, nose and throat clinics at the Waikato and Rotorua Hospitals.

It was felt that the purpose of the survey would be achieved by concentrating as far as possible on schools which contained a large proportion of Maori children in an endeavour to arrive at a true incidence figure of disease. As many as possible of the children so discovered were referred for examination; if some were examined and others missed examination this was purely fortuitous and depended largely on transport problems, not on the urgency or otherwise of the nature of the disease.

3.2 Transport of children

The transport of children found to have disease from school or from home to the special clinics also comes within the province of the Health Department, being carried out by the public health nurses. The selection of the districts from which patients are to be transported and the choice of the actual children must obviously be in the hands of the Department which is most suitably placed to arrange economical grouping of the children for the available public health nurses - some groups may need to travel 50 miles each way.

3.3 Specialist examination

The public health nurse brings a convenient group of referred children to the special clinics which are held twice every three weeks in Hamilton and once every three weeks in Rotorua. She has already completed a form H.-M.S.12 (see Appendix I) for each child, giving details of its surroundings and other matters of general hygiene as well as the specific nature of the abnormality found at the medical officer's examination. As the number brought in by a particular public health nurse is limited by the transport available, the distance to be travelled and the time taken up for each examination, (obviously the whole group must wait until the last of its members has been examined before it can return home) it is advisable to have several groups coming in at regular intervals during one examination session. The examination itself follows the usual lines of any other ear, nose and throat specialist examination and the public health nurse is present the whole time. She can listen to a running commentary on the medical aspects of the case and she may ask any questions she wishes (a typed report is available later). Treatment is prescribed and according to circumstances may be carried out at school or in the home, by a private doctor or the public health nurse, or by one of the district nurses of the Waikato Hospital Board. Examination nearly always includes audiometric testing of the hearing, haemoglobin estimation of the blood and relevant bacteriological examination of swabs.

3.4 The record

Mention has been made of one record of the general circumstances of each case, the form H.-M.S.12. At this stage the result of the specialist examination is entered on another form, H.-M.S.13 (see Appendix II). Experience has shown that this form as it stands needs curtailing in some respects and amplifying in others if it is to continue in use. Part of this record can be filled in at the time of the first examination, and the remainder at the final examination six months later. A particular feature is an evaluation of the treatment and an assessment of the disability. It is necessary to duplicate these records so that one copy can be kept locally while the other is held by the Medical Statistics Branch of the Department of Health in Wellington. An eminent authority issued a warning at the commencement of the survey that the greater the number of examiners the less accurate the data as opinions may differ as between observers* and these medical records have an added value in that they represent the work of no more than two examiners using the same criteria. While it has been embarrassing at times to turn down genuine offers of help from practitioners in the district the reason for doing so is founded on good advice.

* Sir Charles Hercus - personal communication

Apart from special notes and records taken solely for survey purposes the results of the examination and recommendations regarding treatment are transmitted by letter to:-

(a) The child's private doctor, if any.

(b) The District Nursing Service of the Waikato Hospital Board if its help is required.

(c) The public health nurses via the District Office of the Medical Officer of Health. There are certain matters of general public health interest in these letters; in particular the presence or absence of iron deficiency anaemia, and recommendations regarding treatment.

(d) The Education Department via the specialist visiting teacher for the deaf. The interchange of information with this officer saves both parties much unnecessary work, and it is obviously important that he should be informed of the medical aspects of many of the cases he may be dealing with. He can transmit to the schools any matters that should be brought to their notice.

(e) The medical records office of the Waikato Hospital Board.

3.5 The statistical analysis

For this essential part of the survey the Medical Statistics Branch of the Department of Health very kindly provided the technical service.

3.6 The evaluation

Armed with the statistical analysis it is possible to give opinions on the various factors investigated. It is obvious that the work on which these opinions are based has been the combined effort of medical officers of the Health Department, public health nurses and the clinical specialist staff of the Waikato Hospital, as well as the laboratory staff there; it includes much valuable work by the specialist teachers of the deaf and observations from the school-teachers concerned.

3.7 Difficulties

Even before the survey commenced it was apparent that many difficulties would arise; some were overcome but others limited the extent of the survey to a certain degree. Some of the more important are discussed under the following headings:-

3.7.1 Detection of disease

For the survey to be of maximum value it was desirable to examine and record all cases of ear, nose and throat disease discovered by medical officers, who had to examine a whole school and refer all the abnormal Maori children. This, in fact, was found to be impossible and it was therefore difficult to determine the incidence of disease.

3.7.2 Transport of children

As the public health nurse was obviously the person best fitted for the collection and transport of these children from their school to the place of specialist examination, the amount of work had to be within her powers of performance, bearing in mind that she had many other duties as well. If one draws a map of the Waikato Hospital Board area noting the schools with a large number of Maori children, the location of the available public health nurses and their distance from Hamilton or Rotorua, it will be appreciated that the present number of nurses can transport no more than a representative fraction of these children. It follows that this representative fraction needs all the more accurate assessment.

3.7.3 Specialist investigation of disease

The specialist service had to be sufficient to enable a large enough proportion of the children referred to be examined and as this had to be done in addition to the ordinary clinical work of the ear, nose and throat department of Waikato Hospital, only limited time was available for it.

3.7.3 Specialist investigation of disease (cont'd)

The discovery of an abnormality is a much quicker process than its investigation and it was inevitable that medical officers would find more disease in one day than could be surveyed, recorded and evaluated in a week at specialist level. Also, whereas the medical officer could go to a school and make an examination of all the abnormals there, the children so discovered had to be transported in workable groups to a centre where laboratory help and refinement of diagnosis were to hand. It was impossible to work in the reverse way and take the laboratory and many methods of specialist examination to the schools without a lowering of the standard it was essential to preserve. These factors produce an inevitable time lag between the original detection and the specialist examination, during which the nature of the disease can alter.

3.7.4 Clinical service

The survey had to be accompanied by a simultaneous clinical service and although this was far less extensive than it should have been it was decidedly better than no service at all, as would otherwise have been the case.

3.7.5 Personal and group relations

The school survey had to be performed with the minimum disruption of school work.

Care had to be taken not to arouse any feelings of class distinction between Maori and Pakeha children.

Difficulties with parents had to be avoided and the rights of the private medical practitioner safeguarded, as otherwise he might feel the survey to be an infringement of his work.

3.7.6 Assessment of the child's future - follow up examination

An essential part of the survey was the assessment of the social future and employability of each child. This doubled the amount of work because of the necessity for a follow-up examination six months after the original one.

SECTION 4

THE HUMAN MATERIAL

4.1 Maori ancestry

The material for this study is of course Maori school children in the Waikato Hospital Board's district. They are descendants of different "ancestral canoes"; accidents of history and geography caused those descended from the Arawa and Tainui canoes respectively to be of approximately equal numbers; those who claim the Mataatua are considerably fewer than either of the other two tribes.

4.2 Incidence of disease

It is unlikely that differences of climate or other physical features could be enough in themselves to cause any great variation in the disease rate throughout the district; any local difference in incidence is almost certainly dependent on hygiene, economic factors, or the availability of medical attention. In effect, local differences depend more on the rural to urban ratio of population than on anything else. One always assumes that races living "close to nature" are the healthy ones but this is probably quite incorrect. Also, the comparison is usually unfair, as there is hardly an area left in New Zealand, at any rate, where the original inhabitants have not already acquired some of the worst dietetic or other habits of the European interloper. Whereas one pities the state of the Maori in certain urban areas, such for example as Freeman's Bay, Auckland, an infinitely worse state of affairs and a lower health standard probably exist in the areas most removed from civilization.

Isolation of a rural Maori community probably reaches its peak in the Ruatahuna Valley in the Urewera district of the North Island* and recent studies** of this community "indicate an overall poor state of health". Strictly speaking, this area lies outside the boundaries of the Waikato Hospital Board's district; but because the inhabitants there have always used the Board's facilities for their illnesses, and as a good deal of research into their health has been done it seemed sensible to include them. Consequently, the 242 school and preschool children of that valley are included in this statistical survey.

4.3 Maori health in pre-European days

It is interesting to try to form a picture of the health of New Zealanders before the European brought to them the ills as well as the benefits of modern civilization; if it were possible to do so with accuracy it might also be possible to decide what part of disease as we see it today might be regarded as due to inherent susceptibility.

Studies of present day primitive New Zealand communities do not really give an accurate picture of what they must have been like in Captain Cook's day. Although the Maori's surroundings may still be primitive in some parts of New Zealand, as already stated he has picked up the worst of the European's dietetic and other habits, while failing, in part at least, to acquire some of his better ones. Comparative statistical studies in "Maori-European Standards of Health"*** disclose that the Maori today is more susceptible than the European to almost all diseases but this does not help us with our picture of the health of primitive Maoris. Most writers seem to agree that they were a healthy lot, and had no diseases peculiar to themselves. Indeed Dr. Newman in the retiring presidential address at the annual general meeting of the Wellington Philosophical Society, said "From the medical point of view the Maoris are a singularly uninteresting race. They could not boast of one single new disease unless it was a form of leprosy Ngerengere ..... As in all things temporal and spiritual we have given disease to the Maori and received nothing in return, although we gave measles, scarlet fever, typhoid, smallpox."† It is noteworthy that in the last year Dr. Newman's remarks about leprosy have aroused considerable interest ††.

* For further details see Appendix III.

** Prior, Ian, 1962 A Health Survey in a Rural Maori Community", N.Z.Medical Journal, Vol.61 No.359, p.347.

*** Rose, R.J., 1960,"Maori European Standards of Health", Department of Health Special Report Series No.1.

† Transactions N.Z. Institute Feb.21, 1880.

†† (Gluckman, L.,1962, "Leprosy in N.Z. Before the 20th Century" N.Z.Medical Journal, Vol.61 No.360, p.404.
(Rose, B.S., 1962, "Maori Leprosy" N.Z.Medical Journal, Vol.61 No.363,p.562
(McCarthy,D.D.,1963,"What is Leprosy?", N.Z.Medical Journal, Vol.62 No.366 p.74.

4.4 Aetiology of ear disease in the Maori

There does not seem to be any reason for assuming that the Maori, as a race, has any more inherent tendency to ear disease than the European; but there does seem to be every reason for thinking that the excessive amount of ear disease to which many writers have drawn attention* is a product of the Maori's surroundings and his attitude to disease in general. This survey has accepted such a thought but it is in no position to prove or disprove the point, nor indeed is this necessary when considering what is of most practical importance.

4.5 The children

4.5.1 The pre-school child

The Board of Health particularly wished pre-school children to be examined by the service and this has been done; but they have been excluded from the survey as far as incidence figures of disease are concerned. Whereas the total Maori school population in an area was known and the abnormals could be transported in groups for examination, pre-school children could not be handled in such an efficient way.

4.5.2 Distribution

Maori school children are distributed remarkably evenly over the 9,600 square miles of the Board's territory, and Hamilton and Rotorua are natural urban centres with major hospitals; Te Kuiti, Taupo and Tokoroa are secondary ones.

In considering the children for whom this service is necessary it could be said in general that the number of rural Maori children is the real crux of the matter. Urban Maori children already have adequate service "laid on" and the main difficulty is to stimulate them to use it. With a few exceptions, of which Rotorua is a particularly good example, concentrations of Maori children are generally to be found in rural schools. Nearly all those in the Waikato Hospital Board's area which have 30% or more Maori children on the roll are in the country and it is not surprising that, with few exceptions, the "Maori Schools" (under the Education Department and not the South Auckland Education Board) are to be found in areas remote from established medical services. The numbers and distribution of children needing special service are given in Appendices IV and V. For the purpose of this survey "urban" and "rural" are assessed in terms of the practical availability of adequate medical service so that the definition of "urban" does not necessarily indicate living in an area with the amenities of a city; it merely indicates availability of adequate medical attention.

4.5.3 Behaviour and appearance

It is interesting to observe the behaviour of these children when they are brought by a public health nurse to very strange surroundings in a big hospital clinic after a car trip of perhaps 40 miles. They can be rather hungry and tired and they face the prospect of the return trip as well. Nevertheless:

(a) They obviously have implicit confidence in the public health nurse and she has them completely under control.

(b) Their behaviour would put most European children to shame.

(c) It is extremely rare to experience an unco-operative child.

(d) Their standards of cleanliness and neatness are very good.

Indeed, it is true to say that anybody who likes and understands Maori children will get on well with them and nobody who did not like them would wish to remain a public health nurse very long in this district!!

* "Services for the Deaf in New Zealand", 1961, Board of Health Report Series No. 3, p. 14.

SECTION 5

THE STATISTICAL SURVEY

5.1 Number of children examined

The survey commenced in February 1962 and this series closed on October 31st, 1963. During this time 645 children referred by school medical officers were examined but as many of these cases are so "fresh" that the end result of treatment cannot be determined, this figure has no significance in the majority of instances. It amounts to only about 40% of the children referred and in some schools all the Maori children were not examined by a medical officer, although the abnormals were always referred. For this reason the total number seen has been broken down into groups according to how much is known about each of them.

Group 1: All these children were fully examined at clinics and as they had a follow-up at least six months after the initial examination the end result in each case is known. There are 357 children in this group made up as follows:-

Group 1A: A Rotorua group of 158 children referred by medical officers from a number of schools with a total Maori roll of 1,294. Medical officers had examined all the children on the roll and referred the abnormal ones, who were examined and re-checked by the survey (Appendix VI).

Group 1B: A Waikato group of 144 children. Medical officers examined 2,725 children, or 81% of those on the combined rolls. They referred all the abnormals, but because of difficulties in bringing rural children back for a second examination the clinic could document only 144 (40% of the number referred) although a first examination was made of considerably more (Appendix VII).

Group 1C: A Rotorua group of 55 children was examined by the survey and later re-checked but because they comprise an unknown fraction of the total school roll they are of no value in calculating the incidence of disease (Appendix VI).

Group II: This group is made up of 288 children from both districts who were referred to the clinic and given their first examination. As the end result is therefore not known very little use can be made of this material except as regards figures for consecutive cases.

5.2 Analysis of results - Group 1 (357 children)

Information concerning these children has been obtained from an analysis of the answers to the questions on forms H.-M.S.12 and 13, specimens of which are shown in Appendix I and Appendix II respectively.

5.2.1 Urban-rural distribution of survey cases The urban-rural distribution of the survey cases was approximately equal although it is known that the whole area contains slightly more urban than rural children.

5.2.2 Age All but 59 children were aged 5 - 11 years in this 5 - 15 years school age group.

5.2.3 Symptoms In all but 14 children, most of whom had congenital conditions, the reason for referral was acquired deafness or aural discharge.

In the 204 cases where a clear answer could be given, symptoms started before the age of 5 in 172 instances and in only 32 cases did they appear later. This could indicate the importance of adequate treatment of pre-school children.

Medical officers, who were asked to distinguish, if possible, between recurrent suppurative otitis media and the chronic suppurative form, considered the recurrent form to be twice as common as the chronic. This opinion was formed at a school medical examination and was not necessarily the specialist's final one.

It is almost certain that a very large number of the "recurrent" cases would have been called "chronic" had definitions of "chronic" and "recurrent" not been given to medical officers with the request that they endeavour to distinguish carefully between them. The outlook of the recurrent type is quite different from that of true chronic otitis media and its inclusion with the latter means the formation of an entirely false medical picture, the result of which is referred to elsewhere. Acute otitis media as seen at school is rare.

5.2.4 Previous treatment It was surprising to find that approximately three quarters of these children had been seen by a doctor, until it was found that in only 39 cases had the medical examination been made within the previous six months. The real overall picture must therefore still be one of inadequate medical attention.

Details of treatment given and the results obtained were so vague as to be of no practical value.

5.2.5 Suspected aggravating factors Medical officers and public health nurses considered that in only about 10% of cases was the child obviously undernourished and that there had been a previous history of bronchitis or pneumonia in 40%; 50% had, or had had, pyogenic skin infections. They found the question on anaemia impossible to answer in the majority of cases and indeed in only 3% was the presence of anaemia definitely known. Twentyfour per cent were tuberculosis contacts. Slightly under 50% were described as mouth breathers and approximately 50% had been breast fed for various times. Only 15% came from homes where the hygiene could be definitely classed as bad, although 50% were from homes described as fair only.

5.2.6 Effect on school attendance It might not be considered very significant that 64 children, or 30% of those to whom the question applied, should have lost over 5 school days in the 12 months prior to the survey; but one cannot overlook the effect of these diseases on a child's schooling when it is shown that 30 children or 14% lost over 20 school days each during this period.

5.2.7 Specialist diagnosis The following is an analysis of specialist diagnosis of Group 1 children:-

Condition diagnosed	Number of conditions
Otitis externa	20
Otitis externa and media	2
Acute suppurative otitis media	4
Chronic " " "	64
Recurrent " " "	209
Acute catarrhal " "	-
Chronic catarrhal " "	27
Recurrent catarrhal " "	36
Other conditions - congenital and perceptive deafness etc.	14
Total	376

True chronic suppurative otitis media represents about 17% and recurrent suppurative otitis media rather more than 50% of the total cases referred. As this latter condition frequently heals spontaneously, if it is not carefully separated from chronic suppurative otitis media a far too optimistic picture of the results of treatment of true chronic suppurative otitis media will be formed. It is for this reason that many published results of the treatment of chronic suppurative otitis media bear little resemblance to the figures shown in this survey. Nevertheless the importance of the treatment of recurrent suppurative otitis media must not be underestimated.

Not only can this condition itself produce disability but it is also the source of many of the cases which in later years are seen as chronic suppurative and thus are far less amenable to treatment.

Although there were perforations in 159 cases, only four were marginal (indicating an intractable chronic infection) but there were other physical signs of serious significance in many more.

5.2.8 Hearing loss This was calculated from an audiogram but the decibel percentage loss shown was translated into terms of function. In an analysis of the 350 cases to which these figures apply it is seen that:-

(a) In 304 children, or approximately 87%, the loss was under 21 per cent of total hearing. This indicates either no hearing loss or one so slight that it would not be commented on at home or at school.

(b) In 27 children, or approximately 8%, the loss was 21 - 35 per cent of total hearing. Children suffering from a deafness of this degree would probably be recognised as "slow" at school or at home and might occasionally be in trouble for what appeared to be inattention.

(c) In 17 children, or approximately 5%, deafness lay between 36 and 65 per cent of total hearing. This degree should not go unnoticed at school and is not likely to escape recognition by an intelligent mother. It could necessitate the use of a hearing aid in all but the very lowest degrees of hearing loss and special help at school would be necessary in the higher degrees. Most of these children are probably included in the 45 whose disability has been assessed as not necessarily likely to affect expectation of life or employability but to be a handicap in any other than the least exacting forms of employment (see page 34).

(d) In 2 children, or approximately ½%, the deafness was so gross that special educational methods would be necessary. These children are included in the 6 whose disabilities were severe enough to affect their enjoyment and expectation of life, and employability except in the lowest categories (see page 34).

Thus between 5% and 8% of all children seen at the clinics were suffering from deafness sufficient to interfere with their schooling to some degree. This is a good overall figure but it should be pointed out that not only will there be a local variation due to climate and hygiene, but a seasonal one as well, that will affect the whole survey area.

5.2.9 Bacteriological studies

5.2.9.1 Ear swab bacteriological examination This can apply only to those children referred for suppurative conditions. Ear swabs were taken in 130 cases and the results are given in the following table:-

Ear Swabs	
Number of children	Organisms found
26	Coli, Coliform, or Alkaligenes Faecalis Group
14	M.Catarrhalis Diphtheroid or Gram Negative Group
20	Pyocyaneus
4	Pneumococcus
48	B. Proteus
16	Coagulase + Staphylococcus
2	Haemolytic Streptococcus
Total 130	

B. Proteus infection was present in 37% of all cases of aural discharge; its importance is considered in Appendix VIII which will be of interest to otologists.

The appearance of the coli and coliform group in 22% of all cases of discharging ear is also of interest, as although this organism can be found in European ear swabs, it is never present as frequently as this.

It is suggested that this group, being normal inhabitants of the bowel, would occur far less frequently in ear discharges if Maori children were taught to wash their hands after using the lavatory. Some Europeans would do well to pay greater attention to this also.

5.2.9.2 Nasal swab bacteriological examination

(a) Introduction There is cause for suspecting that the nose of the average Maori school child harbours a greater number of disease-causing organisms than does the European child's. As it is an established fact that most suppurative diseases of the ear are the result of an ascending nasal infection from the nose and throat,* via the Eustachian tube, the degree to which Maori children harbour these organisms may be a very important factor in the apparently increased Maori susceptibility to these diseases.

The public health nurses in the districts examined estimate that fully 75% of the children who attend our special clinics come from overcrowded homes where there are many more children than there are beds for them to sleep in. Just as they share bed-clothes and the available air space, so also must they share each other's nasal and throat infections. Although in some instances this state of affairs may be caused by custom it is very often one of necessity.

In the attempt to establish a standard figure for the European school child nasal carrier rate of infection, two organisms in particular need special mention - the pneumococcus and the coagulase + staphylococcus. The latter is widely known as the H.Bug. Much work has been done on the nasal carrier rate of the latter but less note has been taken of the former which is the one most often concerned in ear infections.

Dr.Mary Marples,** in the process of investigating the occurrence of tinea on the feet of Dunedin school children, had occasion to take nasal swabs from a group of these, i.e. children not picked out because of any nasal disease. Out of 113 non-Maori children swabbed only 5 were carrying pneumococcus in the nose, or rather less than 5%.***

English figures, but not exclusively for school children, show pneumococcus present in 14% of noses; the figure however varies widely with the time of the year, pneumococcus being present more in the cold and damp seasons. ✓

A recent survey in Western Samoa ✓✓ for the primary purpose of investigating diphtheria carriers yielded the fact that pneumococci can be recovered from the noses of 21% of Samoan children in the age group 0 - 9 years, the one in which most of the Maori cases fell. This Samoan figure drops to 11% in the 10 - 19 years group and to 4% and under as age increases.

* but for a contrary view see
McNeill, R.A., 1962, J. of Laryg. and Otol. LXXVI No. 8 p. 621.

** Marples, Mary J. and Chapman, Eileen N., 1959, British Journal of Dermatology, Vol. 71, No. 12.

*** Personal communication.

✓ Topley and Wilson, "Principles of Bacteriology and Immunity" 3rd Edition, p. 1992-93-94.

✓✓ Marples, Mary J., Marples, R.R. and Muir, B., 1960, Transaction of the Royal Society of Tropical Medicine and Hygiene , Vol. 54 No. 2, p. 165.

The Huiarau School in the Ruatahuna Valley is notorious for the frequency of chronic suppurative otitis media in its children. Indeed in January 1962 10% of the whole school was found to be suffering from what appeared to be this condition. In October of that year random nasal swabs were taken and 64% contained pneumococci. Admittedly the carrier rate was probably at its highest at that particular time for there had been almost continuous rain and cold all the winter and general hygienic conditions were at their worst.

Much work of this nature needs to be done before one can be certain that a high carrier rate of nasal infection is typical of all Maori children.

The staphylococcus (the H.Bug of journalism) is also worthy of note in this connection although the investigations which produced the figures quoted were made for an entirely different reason, this being the spread of infection in patients admitted to hospitals with "clean" conditions and also because patients admitted with infected conditions sometimes changed one infection for another of a worse type. Some forms of investigation led to the taking of routine nasal swabs from all patients admitted to certain wards. It is interesting to compare the figures showing the prevalence of staphylococcus in these cases with figures for the same organism taken from the Ruatahuna Maori children. As two different age groups are being compared deductions should not be taken too far.

PNEUMOCOCCAL NASAL CARRIER RATES

Race	Place	Authority	Pneumococcal nasal carrier rate
European	Dunedin	Marples & Chapman	Less than 5%
European	England	Topley & Wilson	Less than 14%
Samoan	Western Samoa	Marples, Marples & Muir	21% falling to 11%
Maori	Ruatahuna	Present survey	64%

COAGULASE + STAPHYLOCOCCAL NASAL CARRIER RATE

Nature of material	Authority	Staphylococcal nasal carrier rate
Consecutive patients admitted to an adult ward in N.Z. for conditions other than nasal ones.	Burry,A.F.: Beaven, D.W.: Main B.W. & Rose G.R., 1962 N.Z. Med.J.61 296	22%
Similar	Markham, N.P. & Shott, H.C.W. 1961 N.Z.Med. Journal, p.478	30 - 60%
Swabs from noses of 91 Maori children taken at random at Ruatahuna 1962.	Present survey	15%

(b) Results

Nasal swabs were taken only in those cases where the nose appeared abnormal i.e. not as a routine measure. The following organisms were present:-

Organism	Number of Children
No growth	1
Coli	1
Catarrhalis	9
Pyocyaneus	1
Pneumococcus	29
Staphylococcus	9
Other infections mostly yeasts	6
Total swabbed	56
Not done	301
Total	357

It is thus seen that pneumococcal infection in the case of obvious disease was more common than all other infections put together. Indeed this organism was proved to be present in the noses of 8% of the 357 children in the survey group even when only 56 were swabbed because their noses were obviously abnormal. It is impossible to say how frequently this organism would have been shown to be present had every child referred to the clinic been swabbed whether the nose appeared normal or not. It is probable that the Ruatahuna figure for pneumococcal infection of the nose would not have been reached but it seems certain that such nasal infections are much more common in the Maori child than in the Pakeha and it is suspected that they have a great deal to do with the prevalence of ear, nose and throat disease in general.

5.2.10 Condition of teeth 8% of the children had teeth that obviously needed attention.

5.2.11 Tonsils and adenoids Of the 326 children who had tonsils, those of 181 were considered infected or enlarged. Adenoids, taken as a separate entity, were regarded as abnormal in 143 cases. It thus appears that in this particular survey group 60% of the children had abnormal tonsils and 48% abnormal adenoids. This result has thrown doubt on the idea once held that the incidence of these diseases is low in Maori children, and bears out the opinion expressed in "Maori - European Standards of Health"*

5.2.12 Enlargement of cervical glands Enlarged cervical glands were present in approximately half the children examined.

5.2.13 Pyogenic skin infections of the head and neck About 9% of the children had pyogenic skin infections of the head and neck. This figure was far lower than expected and to some degree indicates a fair general hygiene of the group.

5.2.14 Sinus X-rays In only about 7% of the children examined did sinus x-ray appear necessary. The fact that a certain number may have proved abnormal (20) is of no significance for there was little point in x-raying cases when sinusitis was obvious on clinical examination.

5.2.15 Iron deficiency anaemia: all groups This has been the subject of world-wide study especially in view of the fact that incidence can be influenced by public health measures; for when this form of anaemia is found it can be successfully treated by medical means.

* R.J. Rose, 1960, "Maori-European Standards of Health", Department of Health Special Report Series No. 1, Item 17 p. 34.

Strictly speaking, haemoglobin values alone do not constitute a diagnosis of iron deficiency anaemia, but in the great majority of cases in children they can be accepted as sufficiently accurate; for the purpose of this survey therefore haemoglobin values have been taken as indicative of the presence or absence of iron deficiency anaemia.

The values for haemoglobin in the blood below which anaemia is said to be present are constant all over the world according to age, and they make no concession for race or climate (apart from the well known fact of height of the locality). It is true that the mean value for haemoglobin in those examined in an area will depend, inter alia, on the hygiene of that area, but the figures given by the World Health Organisation Study Group* are ideal ones for health, and represent what ought to exist; being so they are of universal application to Maori, Pakeha, or the Australian aboriginal. The application of these standards to New Zealand has already produced a mass of detailed information and the condensation of a summary of one of the most recent surveys** is quoted here:

> "An examination of haemoglobin levels of children admitted to six New Zealand Public Hospitals shows that between birth and the age of 4 there is a considerable difference between the haemoglobin levels in the two races, except in the Wellington area where the little difference between the races is not significant."

Routine haemoglobin estimations have been done by the photoelectric colorimetry method at the Waikato and Rotorua hospitals, this method being accepted as sufficiently accurate for a field check by the World Health Organisation Study Group report.*** The survey team itself was in no position to define a standard of normality for haemoglobin in terms of grammes %, as it was dealing with an abnormal sample of children, so the standard suggested by this study group was adopted as being applicable to the Maori race. The objects of the survey, in its estimations, are:-

(a) To ascertain the percentage of children in each age group that falls below this World Health standard.

(b) To discover if there is any feature, apart from infection, common to these anaemic children, as shown in the details available regarding them.

(c) To arrange suitable treatment for the children found to be anaemic.

(d) To express the findings in a way that could be useful to anyone making a more detailed haematological study.

A graph of the mean haemoglobin levels of the first 150 cases of the series (who all have some form of disease) falls neatly in between the curves of the haemoglobin levels of a "whole child population" at Te Karaka and at Ruatahuna respectively. This is mentioned here to indicate that in this respect the mean level of haemoglobin values in this survey is not markedly different from that found elsewhere in New Zealand. ≠

* World Health Organisation, 1959, Technical Report Series 182 p.4-5.

** Akel, R.N. et al, 1963, "Anaemia in Maori and European Infants and Children", N.Z. Med. Journal, Vol. 62 No. 363 p. 29 et seq.

*** World Health Organisation, 1959, Technical Report Series 182 p. 4-5.

≠ Neave, Prior and Toms, 1963, N.Z. Med. Journal, Vol. 62, No. 365 p. 25.

From the inception of the survey, records have been kept of the number of cases of iron-deficiency anaemia discovered and they are shown below. To present a clearer picture, pre-school children and infants have been omitted as it was not possible to assess the number of normals.

Abnormal Maori Schoolchildren Referred for Ear, Nose and Throat Conditions who were found to have Iron-Deficiency Anaemia

Area	Number examined	Number and percentage found to have iron-deficiency anaemia
Waikato	362	36 or 10%
Rotorua	283	17 or 6%
Combined	645	53 or 8%

Although iron-deficiency anaemia is known to be very common in younger age groups of Maori children, the above figures were surprising. In spite of being derived from an abnormal (potentially infected) sample of school population the fact remains that, without this survey, 53 Maori children would have received no treatment for their anaemia. In this limited field alone the ear, nose and throat service would appear to have gone a long way towards justifying its existence and an extension of its activities would seem to be one of the best ways of discovering the 170 - 350 further cases that probably exist and could be detected by this means.

The foregoing is the position disclosed when a study is made of consecutive cases referred to the clinic with ear, nose and throat conditions. These cases include a very large number of rural Maori children who were excluded from Group 1 because, being so rural, they could not be brought back for re-examination. An assessment of anaemia in this smaller and more urban group will show it to be far less frequent.

Anaemia in a Selected Group of 357 Children Referred for Ear, Nose and Throat Conditions (Group 1)

Number of children with haemoglobin levels below normal health standards	14
Number at or above this level	281
Number of children where a test could not be made or where an unsatisfactory method had been used	62
Total	357

In this group only 4% were found to be anaemic.

It is considered therefore that between 4% and 8% of all Maori children seen at the special ear, nose and throat clinics have an iron-deficiency anaemia but it is not claimed that this figure can be used to express the incidence of the disease in all Maori children in the Waikato Hospital Board area.

There seems little doubt that sub-standard housing and sub-standard hygiene in its widest sense contribute to upper respiratory infection and therefore to otitis media. They also contribute directly to anaemia and it is virtually impossible to separate cause from result in the otitis media - anaemia complex, nor is there much practical value in trying to do so. It is suggested that the investigation of Maori infant and pre-school children for anaemia, and the treatment of this when discovered, would do much towards the reduction of the Maori schoolchild ear, nose and throat problem later.

5.2.16 Condition of children on assessment of treatment

The following table shows the condition of the children in Group 1 on assessment of treatment.

Condition of Children on Assessment of Treatment – Group 1

Condition	Number of children
Cured	165 – (101 by treatment and 64 spontaneously)
Relieved	78
Unrelieved	112
Died	0
Not stated	2
Total	357

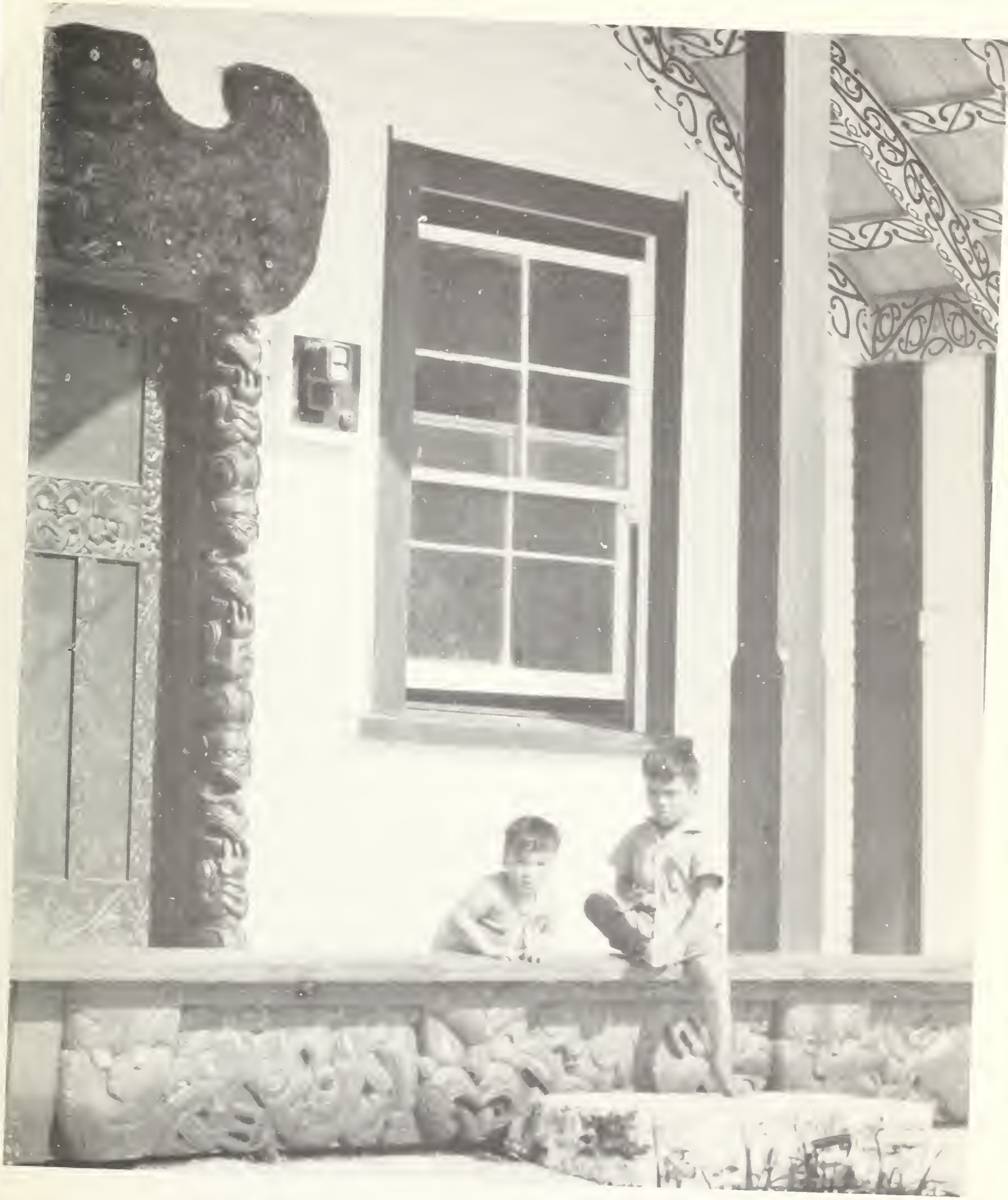
As the prime function of this survey was to carry out what the name indicates there was a good chance to record, but usually no chance to treat. The above figures show what happened, not what might have happened had it been possible to carry out surgical treatment in all cases where this was advised and had it been practicable to treat the non-surgical cases more frequently. When the assessment was made 101 children were still awaiting surgery and naturally they lacked the opportunity to be cured or relieved. The above table shows that 45% of the 357 children apparently derived little benefit from a degree of treatment that falls at some undefinable position between no treatment on the one hand, and really adequate treatment on the other. It must be stressed that these figures are of no value in making comparisons between the results of this survey and other surveys because:-

(a) This survey was designed to give a functional assessment of diseases from which an assessment of the result of their ravages could be made. A disease can be "cured" yet the irreversible effect of it persist and cause a social disability. In the case of chronic suppurative otitis media for example, a surgeon may cure the aural discharge and claim to have cured the case, even though a moderate or severe degree of deafness inevitably persists. This survey would classify such a case as "relieved" because although the discharge may be cured, the persisting deafness will be a social disability.

(b) The effect of recommended surgical treatment not having been carried out in such a large number of cases cannot be assessed, but it is interesting to note from an analysis of the 165 children shown as cured, that in 64 instances when surgical treatment had been ordered but not carried out final examination nevertheless showed these children as being cured. In other words 40% had "beaten the pistol" and the service could hardly claim the credit for the cure. Spontaneous, unexpected cure could be recognised in approximately 20% of all the 357 children of this survey group.

5.2.17 School hearing grade

The following table shows the school hearing grade of the children in Group 1.



The challenge of youth

A Public Health Nurse bringing in a group of children for examination at Waikato Hospital, Hamilton. They may have travelled forty miles or more, and in winter months they may have left home shortly after daylight. For many such children this will be their first experience of a city and of a hospital

An E.N.T. Specialist conducting an examination

A Polynesian smiles

School Hearing Grade - Group 1

Grade	Description	Number of children
Grade 0	Normal hearing	103
Grade I	Deafness that might be described as of nuisance value	220
Grade IIA	Progress could be made at school with extra help and a favourable position in the class etc.	30
Grade IIB	So deaf that they would need hearing aids at home and at school and the frequent observation of a specialist visiting teacher of the deaf.	2
Grade III	Special institutional education required	1
Not stated		1
	Total	357

The slight discrepancy between the above figures and those shown under "hearing loss" on page 22 is due to the fact that Grade I does not include children with normal hearing - it is the first grade of actual deafness.

The 30 children in Grade IIA may not occasion work for a specialist visiting teacher of the deaf once they have been detected, provided they progress. Some of them will not do so and they, as well as the 3 children in the remaining grades, will occasion a great amount of work for the education specialists.

5.2.18 Nature of disabilities The following table shows the nature of the disabilities present in Group 1 children:

Nature of disability	Number of children
1. No disability	179
2. Deafness	55
3. Poor general health, the result of the infection present or the inconvenience of ear discharge, attacks of pain, loss of school time etc.	93
4. A combination of 2 and 3	30
Total	357

This shows that out of the 357 children originally surveyed approximately half were discharged without any disability at all.

To appreciate the disability of the 93 children in category 2 it must be realised that a child who has one discharging ear and normal hearing in the other may have practically no disability from hearing loss but can have considerable disability from pain, the unpleasantness of aural discharge and a degree of poor general health from a septic process. There is now no point in trying to assess the position for deafness alone or for deafness with other conditions: what is of moment is the severity of the disability and the effect it is likely to have on the child's future life.

5.2.19 Assessment of the severity of the disabilities and their significance

The following is an assessment of the severity of the disabilities found in Group 1 and their significance for the future of the children

Degree of disability	Number of children
Deafness and/or poor general health severe enough to affect a child's enjoyment of life, expectation of life and employability later except in the lowest of categories.	6
A lesser degree that will not necessarily affect expectation of life or employability but will nevertheless be a handicap in any but the less exacting forms of livelihood which the child will probably follow at any rate.	45
A degree that is of no more than a slight nuisance value in a civilized community	87
Not applicable as too slight or absent	219
Total	357

Slightly under 2% of the 357 children surveyed are likely to be more or less severely affected by their disability as children, and later as adults to be in some measure an economic loss to the country. However, 12.5% have some handicap from these troubles.

5.2.20 Percentage of ear, nose and throat abnormalities found by medical officers at school examinations

No difficulty presented with Group 1A. Medical officers examined all the Maori children attending the schools in this group and the special clinic examined all the abnormals thus referred. One hundred and fifty eight children from a total of 1,294 (12%) had ear, nose and throat abnormalities. Due to lack of time, the clinic was able to examine and document only 144 children from Group 1B. As this number was known to be not more than 40% of those referred as the result of 2,725 school examinations the total number of abnormals in the group was estimated to be 360 giving an incidence rate of 13%. The fact that medical officers had examined only 81% of the children on the rolls of this group did not materially alter this assessment.

As the Waikato Hospital Board's area is estimated to contain 4,886 rural Maori children the above incidence rate of disease leads one to the startling conclusion that 500 of these children will be suffering from an ear, nose and throat condition and because of their rural domicile very few of them will receive adequate treatment. Spontaneous cure will occur in half of them later.

Two per cent of all children referred appear to have a disability severe enough to affect their enjoyment of life, their education and their employability at a later stage, (see "Assessment of the severity of the disabilities and their significance" above).

Within the Board's area there are probably thirty Maori children whose future has already been jeopardized by conditions that have become largely irreversible. They are an educational problem now, they will have poor health and at a later stage their employability will be restricted to the lowest categories.

5.2.21 Chronic suppurative otitis media

5.2.21.1 General - what is chronic suppurative otitis media?

This term is frequently used as a convenient label to attach to any case of obviously discharging ear. The examiner may lack the chance to ascertain for how long and how continuously the ear has been discharging and he may lack the time, facilities, or indeed the inclination, to spend perhaps a quarter of an hour in detailed examination. Medical definitions, unfortunately, differ in what really is implied, but all specialists would be unanimous in condemning the use of this term to describe a state where the ear canal is full of pus and where no further attempt in diagnosis is made for any of the reasons given. Because such labelling has been done in the past many incidence figures for true chronic suppurative otitis media (often referred to as C.S.O.M.) are far too high. Lack of an adequate examination has led to the inclusion in this classification, of cases

(a) where the ear infection was recurrent and not chronic.

(b) where the infection was a skin infection of the canal and not of the middle ear.

(c) occasionally, where the condition was acute.

These three states carry quite a different outlook from chronic suppurative otitis media and although unpleasant for the patient, are far less likely to result in the serious consequences of true suppurative otitis media. The present survey draws a clear distinction between these different classes and the incidence figures will be lower than might be expected from non-specialist surveys. For practical purposes chronic suppurative otitis media is taken to indicate a middle ear infection which has lasted continuously for over six weeks. Some medical writers express in their definition of it a state which will be permanent, except the diseased tissue be removed by operation, but this survey allows of the possibility of cure by non-operative measures or even naturally, as far as discharge is concerned, and this happens not infrequently. It is realised that not everybody would agree with this definition nor do we ourselves think it always accurate; but it is at least practical in the light of the information this survey wishes to give. Statistically, it is most unfortunate that chronic suppurative otitis media can mean so many things to so many people.

Diagnosis of ear diseases is not as simple as might be imagined - it is very easy to miss a discharging ear altogether. War conditions admittedly make a difference, but the point is illustrated by the fact that out of the first thousand cases attending a military hospital in England in 1941 no less than 243 had chronic suppurative otitis media, i.e. they had been completely missed in the original medical examination. *

5.2.21.2 Some overseas incidence rates

The following overseas figures are not strictly comparable with those of the present survey for they are older and deal with a different age group, but they are instructive.

(a) Army records in America show that in 1918 from a million men called up 6.81 per 1000 were considered to have chronic suppurative otitis media.**

(b) In 1932 in London 1.1% of the entire school population was treated for chronic discharging ear.***

(c) Formby (1942) quoted by Lewis and Gray reported that just over 2% of recruits examined during World War II were rejected because of chronic ear disease.✓

* Lewis,R.S. & Gray,J.D., 1951, Brit. Med. Journal p. 939 quoting Miles Formby.

** Stirk Adams

*** Annual Report of the L.C.C., 1932, Vol. 3, Part 2, p. 24.

✓ Lewis,R.S. & Gray,J.D., 1951, Brit. Med. Journal, p. 939.

5.2.21.3 Incidence at Huiarau School, Ruatahuna

In 1962, in conjunction with Dr. Margaret Neave of the Department of Health, the writer made an examination of all children at the Huiarau School, Ruatahuna, who had been found by her to have abnormal ear conditions. This school is almost entirely Maori and of the 149 children on the roll Dr. Neave had screened out 32 as having ear defects; examination showed that in 13 cases the defect was chronic suppurative otitis media. This gives an incidence figure of approximately 10% in that area.

The report of the Department of Health for the year ended March 1962 (pages 18 and 19 of the "Child Health" section) shows that 10.74% of the children examined had defects and that of these otitis media was the most common. This figure is very similar to that of the present survey where medical officers found similar defects in 12.5% of all cases examined by them; The Department's report likewise found some form of suppurative otitis media to be the condition for which children were most frequently referred. However, it did not quote a figure for the incidence rate of chronic suppurative otitis media.

5.2.21.4 Present survey figures

In the past most attention has been centred on chronic suppurative otitis media because of its known serious consequences but it is considered that misleading figures have sometimes been presented by the non-recognition of "recurrent suppurative otitis media" which carries a very different outlook. For this reason, spontaneous cure of chronic suppurative otitis media or cure as the result of treatment has often been claimed when it is felt by this survey that the diagnosis was incorrect to begin with.

The following table gives an analysis of diseases found in the Rotorua Group 1A after recurrent suppurative otitis media had been distinguished from true chronic suppurative otitis media.

Analysis of disease in 158 children referred from Rotorua Group 1A (total roll 1,294)

Final diagnosis	Number of children
Chronic suppurative otitis media	19
Recurrent " " "	76
Chronic catarrhal " "	10
Recurrent " " "	4
Acute suppurative " "	1
Other	48
Total	158

As these children were all the abnormals discovered in the complete examination of schools with a total Maori roll of 1,294 it can be said that in this group the incidence rate of chronic suppurative otitis media was 1.5%. Had the recurrent type not been separated it would have appeared that "suppurative conditions" were present in 7% of cases. This is true, but it is misleading when one considers the likely end result of each of the two conditions. Whereas recurrent suppurative otitis media, as its name suggests, may cease to recur, a surgeon would think himself lucky if he could arrest chronic suppurative otitis media in three cases out of four treated, even in the most favourable circumstances.

Eighty-one per cent, or 2,725 children, of the combined rolls of a Waikato group of schools (Group 1B) had been examined by medical officers and 41% were seen by the special clinic.

Thirty-three cases of chronic suppurative otitis media were diagnosed amongst these children from which it was inferred that 80 cases were present in the total number of abnormals found by medical officers, giving an incidence rate of 3%.

It is probable that the Ruatahuna rate of 10% is as high as the incidence is now likely to go in a community of that type and there are other such groups in the district. Nevertheless it would seem that under 1962 and 1963 conditions an incidence rate of 2% would be a fair assessment for true chronic suppurative otitis media over the whole of the Board's area.

Even this low assessment of the incidence would indicate that there are 250 children with this disease in the Board's area and that 80 of them have no chance of receiving adequate treatment under present conditions.

One feels quite sure that incidence rates such as the present Ruatahuna figure were once typical of the whole district. Even if figures from previous reports did include cases that would be excluded by this survey the fact remains that some form of suppuration in the ears was extremely common. Great changes have come over the district in the last thirty years and to apply Ruatahuna figures to the whole of the Board's area would give quite a wrong picture. Indeed it would seem that the incidence figure for chronic suppurative otitis media for 1962-63 (2%) is surprisingly similar to that of the London school child population in 1932 (1.1%).

5.2.22 Nature of treatment used

5.2.22.1 Non operative In the main this refers to outpatient treatment which had to be chosen not necessarily on the grounds of potency, but on the possibility of its practical application. Had supervision been practicable, treatment other than boric-iodine powder could have been given, but as it was unusual to be able to re-examine a child within six weeks the choice was greatly limited. As a result this survey was unable to carry out a comparative study of local treatments.

5.2.22.2 Operative (a) Ancillary surgical treatment for tonsils and adenoids and nasal sinus infections

There is no doubt that these operations proved their worth in the treatment of deafness and discharging ears. Older generations of practitioners considered that it was rare to see Maori children whose ill health was caused by enlarged or infected tonsils and adenoids. It is suggested in "Maori-European Standards of Health"* that this belief may have come about through the parents not bothering to take these children to a doctor, such conditions consequently escaping observation. The present survey recommended the removal of tonsils and adenoids on account of secondary troubles such as deafness and aural discharge in 181 of the 357 cases examined, and it is considered that enlarged or infected tonsils and adenoids are not at all uncommon in Maori children. Major surgery for infection, i.e., various forms of mastoid operations, is not indicated as often as might be expected. Many cases are recurrent rather than chronic and these may eventually cease to give trouble, even if no treatment at all is carried out. The "hard core" referred to elsewhere is always with us. Some of these children will come to no serious trouble, although their ears may discharge all their lives. Others have conditions that are potentially dangerous and should be treated by some form of radical operation if every method of conservative treatment fails. It is estimated that there are 250 such potentially dangerous cases at present in this district. Unfortunately, there is no guarantee that operation will cure their aural discharge, the main object being to make life safer for them.

* R.J. Rose, 1960, "Maori-European Standards of Health", Department of Health Special Report Series No. 1, p. 34.

It is difficult enough in the Pakeha child to secure a "dry" ear by radical operation, and unfortunately it is very much harder to do so with the Maori. Recurrent upper respiratory infections and lack of the necessary attention after leaving hospital tend to destroy the good that the operation might otherwise have done.

(b) Operations for the relief of deafness

The type of deafness for which the modern stapedectomy operations are done will not have shown itself as yet in this age group. There remains deafness which is the result of large chronic perforations of the drums and of scarring in the middle ear. Operations for this are done when the infection and the liability to recurrence have died out. At the ages under consideration the condition is still likely to flare up with every head cold or every time the child goes swimming.

A certain number of these cases may later be improved by tympanoplasty but this might not be indicated in more than 1% or thereabouts of the children referred. In general one feels quite safe in saying that these latter operations alone will do little to alter the overall picture of ear disease in the Maori.

(c) Details of operative treatment (Group 1)

In Group 1 (357 children) surgery was either proposed or performed in 167 cases. Therefore almost half the children referred needed surgical treatment necessitating admission to hospital if only for a short time as for tonsil and adenoid operations etc. In only two instances was a major operation found necessary. Details of operative treatment advised or performed are as follows:-

Treatment	Number of children
Tonsil and adenoid operations performed	48
Children awaiting surgery	101
Mastoid operation	2
Antral puncture	11
Refused operation	1
Other or multiple	4
Total	167

5.2.23 Results of treatment

No real results of treatment can be shown because of lack of uniformity in the amount various children were given. In many cases this clinic saw a patient six months after the first examination, the degree of treatment received in the interval having naturally been quite inadequate. It can be seen from the foregoing table that if 101 children from a group of 357 are still awaiting surgery at least 6 months after it was recommended, the results of treatment of the whole group mean nothing at all except to indicate that some little good is being done. The following quite unexpected finding is shown in Appendix IX. In two contrasted groups of children, one urban and one rural, suffering from the same diseases, the apparent results are similar whereas one would have expected the former to be far more favourably placed to receive treatment and therefore to have a better end result. The explanation could be that either the urban Maori does not use the opportunities for treatment offered or else extra attention to the rural group by the survey has minimised the latter's disadvantages. Probably both these factors are involved.

SECTION 6

RECOMMENDATIONS FOR AN EXPANDED SERVICE FOR THE MAORI CHILDREN OF THE WAIKATO HOSPITAL BOARD'S DISTRICT

The present clinical service for these children was intended as a pilot service only, and as such it has examined no more than about 40% of the cases of disease discovered by medical officers in the schools since its commencement in February, 1962. Indeed, the position is worse than this, for medical officers could have examined more schools in that time had there been any possibility of the service treatment keeping up with them.

6.1 Scope of the expanded service

Before going any further it is necessary to remember that what follows refers in particular to medical treatment as some form of extension of a hospital service. The detection and prevention of disease are not to be minimised in importance and the fact that the rest of this section refers only to the cure of disease should not be taken as detracting from their value. They are however more the function of the Department of Health, which is quite aware of the state of Maori hygiene in rural areas and has done a very great deal in improving it. More still could have been done had additional public health nurses been available. Better health education of the Maori, which comes under the heading of "prevention", will undoubtedly have a marked effect on the incidence of disease in the future, but if he is to be encouraged to have faith in the service it is vital to see he is not promised results that cannot be made good in practice. For this reason the service in the Waikato has avoided any publicity of its work until now when it can be shown that a certain amount of effort can produce a certain result on Maori health.

6.2 The nature of the cases to be treated

As stated previously it is in rural areas that the greatest need for a service is evident and in framing these suggestions the urban have not been considered. Cases may be divided into the following two types:

(a) Intensive therapy cases These cases prove resistant to the usual forms of home treatment. The best chance of curing them lies either in the use of drugs, which may necessitate the child's being under good observation, or else in daily ear toilet given by a trained staff. Although it may be customary to treat such cases as outpatients in densely populated countries, Waikato conditions would necessitate the provision of hospital beds for them. There could be fifty such children in the district but as many of their parents might not consent to inpatient treatment, it is estimated that ten hospital beds should be devoted to the treatment of this type of case.

(b) The remainder It appears impossible to suggest one form of service equally applicable to all the varying conditions found in the Board's district, including the availability of practitioner service, that would stand a chance of success. It seems that in the absence of a private doctor the original detection of disease and the referral of patients for treatment should be a function of those concerned with the medical inspection of schools, i.e. school medical officers of the Department of Health. The actual treatment could be carried out in many cases by the parents themselves, if supervised, and they should be encouraged to do this as much as possible. It is from this stage onwards that variations in procedure will necessarily occur between one area and the next; those concerned in treatment, apart from the patient's parents, being the district nurse (Waikato Hospital Board), public health nurse (Department of Health), general practitioner, and ear, nose and throat specialist. It will be appreciated however that any service dealing with approximately 35% of the total Maori schoolchild population of this Hospital Board's area (12,887) could be no more than specialist-supervised.

6.3 Physical features of the Board's district and distribution of population

A description of the physical differences between the various parts of the Board's district and the distribution of population will make the difficulties clear. The district has been divided into the following areas and it will be shown that they are very differently constituted; some have an extremely scattered Maori school child population that can never be assembled in large groups, and poor communications; others, although they contain a large number of children, have them concentrated in large schools and there are good communications. Here again the rural population is the one to be considered and transport is once more a difficulty. A brief description of the various areas follows:- (Appendix X shows a map of the Board's district)

(a) Area to the west of the Pokeno-Hamilton-Te Kuiti main highway

Distribution of the rural Maori population largely follows the primitive one but the numbers are only a shadow of the large population that once lived there. A succession of shallow harbours such as Kawhia, Aotea, Raglan and the Waikato Heads contained a plentiful supply of fish and pipi beds, and was a sort of Maori gold coast; what was wealth to the Maori however was not necessarily sought after by the Pakeha. Shells from the pipi beds and the terraces of old pa sites are to be found on almost every headland and every isolated hill in this area, and speak of the very large Maori population that once would have been needed to defend this vast number of fortifications. The Pakeha, living on the products of agriculture and manufacture, formed his centres of population more to the east. The ruggedness of this western area with its poor communications and the disproportionately large Maori population living in small isolated groups, as well as the general lack of attraction of medical practice here, make it impossible to propose any practical service similar to what might function well elsewhere. Special help is necessary.

(b) Inland areas round the main Pokeno-Hamilton-Te Kuiti main highway

The problem here is quite different on account of the numerous towns with available medical service as well as the specialist services of a large city hospital at Hamilton. Communications are excellent. The number of Maori children is very considerable and although their homes may be "out-back" the children are collected every day and transported to schools where a large number can be observed in a comparatively short time. Various schools in Huntly, Ngaruawahia, Otorohanga, and in particular Te Kuiti, are good examples of this.

(c) North East from Hamilton to Te Aroha and east to Putaruru and Tirau

These are similar to the previous inland areas. There is not a large number of Maori children in the schools until one travels further south-east to Tokoroa and Mangakino where local industry and construction have attracted a large, floating Maori population. Communications here are also good, and there could be adequate local medical attention.

This Waikato area (a, b and c) contains 7,531 Maori children in 242 schools. Two thousand, eight hundred and fiftythree children of this number in 74 schools need special service.

(d) Rotorua-Taupo area

The natural features of the district influenced the size and distribution of the original Maori population here; where there was a good supply of boiling water there was also a concentration of Maori population. When the Pakeha came this boiling water, being generally associated with geysers and other tourist attractions, drew a local European population as well. Later still, to tourism were added forestry and fishing, and farming when the management of pumice land was finally understood. This area contains a city with a large base hospital and a large Maori population in the immediate vicinity.

Many of these Maoris live in much the same manner as Europeans, and it should be only a question of time before the effects of education and improved hygiene minimize any difference between the standards of health of local Maori and European children. To a lesser degree the same can be said of Taupo, which is fast becoming a potential centre for medical treatment.

The large Maori population of Rotorua itself is indicated by the figures for Maori schoolchildren in the Rotorua-Taupo area and Appendix V is drawn up slightly differently from the Waikato one for this reason.

Whereas the total Maori schoolchild population for the Rotorua-Taupo area is 5,356, fully 3,285 can be classed as urban for the purpose of this survey and it is hoped that education will lead them to their own doctors for necessary treatment. Again it is with the remaining 2,033 rural Maori children in 23 schools that we are concerned. It is with children in such remote areas as Te Whaiti and Ruatahuna that the problem of treatment will lie; it is there that special help may be necessary.

As a result of recent Cabinet decisions there will, in the near future, be a spectacular growth of the village of Turangi at the southern end of Lake Taupo, just as the construction stage of Mangakino produced a large Maori influx there. It is to be hoped that wise planning at Turangi will prevent a repetition of the ear, nose and throat "hot spot" which persisted at Mangakino until special attention was given to it recently.

The distribution of Maori schoolchildren in the Waikato Hospital Board's district for whom special service is necessary is therefore as follows:-

Maori children at rural schools - Waikato Hospital Board's District

Area	Number of Maori children	Number of rural schools
Waikato	2,853	74
Rotorua-Taupo	2,033	20
Total	4,886	94

It will be remembered that the definitions of "rural" and "urban" refer only to the availability of existing medical services. Schools with a roll of less than 10 Maori children have been omitted as a service for them would be too costly in time for the result obtained.

6.4 Possible extension of the district

It might be pointed out here that the arbitary boundary of the survey area - confined as it is to the Waikato Hospital Board's district - has left a large section of rural Maoridom just over the border in the areas serviced by Tauranga and the Bay of Plenty. In any national consideration of the whole problem at a later stage a good point could be made for a local service embracing the Waikato and Rotorua-Taupo Health Districts. Such a combination would be a very compact one and would cover approximately 25% of the Maori children of the North Island.

6.5 Conclusions

(a) Type of additional service

Because of the varying physical characteristics of the district and differences in the available medical services, it follows that the type of service additional to that already in existence must vary in detail from area to area.

(b) The carrying out of treatment

Because of the large number of Maori children involved and their wide dispersal, it is essential to teach and stimulate Maori families to carry out many of the necessary ear toilets and treatments themselves. This is already in line with the general policy of the Department of Health, but it can be carried out only up to a point; for there will always be lazy or stupid parents, and there will always be the occasional virulent infection.

In many areas it will be possible and advisable for a public health or district nurse to carry out daily treatment for the child; in other cases it will be sufficient if she supervises the treatment carried out by the parents. There are some instances where progress could be made only if daily treatment were carried out by some responsible person at school.

(c) General medical practitioner service

As it would be impossible and unnecessary for a specialist to see all cases of disease in any one area and also unrealistic and unwise to train specialist medical staff for no purpose other than that of the Maori ear, nose and throat service, it follows that the most economical use, medically speaking, should be made of the present medical staff available. In many instances it would be possible for a local general practitioner to give all the advice necessary and to supervise treatment, and thus avoid encumbering the specialist service unnecessarily. Indeed, with a little specialist help he might be able to attend to the majority of the cases referred to him. Consideration might also be given to medical officers of the Department of Health supervising treatment in some areas.

(d) General hygiene of rural families

Because an improvement in the general hygiene of back-country Maori families would diminish "source of supply" of infections, every effort should be made to maintain and encourage the work that the Department of Health is already doing in this sphere. In particular, attention to, and the treatment of, iron deficiency anaemia in Maori children should be stressed.

(e) Liaison between district and public health nurses

As the respective spheres of the district nurse and the public health nurse may overlap according to circumstances and to the availability of each, the liaison that already exists between them should be encouraged.

(f) Statistical records

As lack of a clear statistical picture of these diseases has been in the past one of the main reasons for the lack of interest in them, it is essential to maintain records sufficiently detailed to be statistically significant. An amended and simplified version of the forms used in this survey as shown in the appendices could be used. Although the keeping of such records entails a surprising volume of clerical work, it has a marked effect on the morale of everybody connected with the service. A good recording system is also vital to the maintenance of that liaison between the Health and Education Departments, the general practitioner and the Waikato Hospital, which has been one of the outstanding features of this service so far.

(g) Specialist service

The present ear, nose and throat specialist staff of the Waikato Hospital has carried out this survey and service in the time "left over" from the clinical work of this hospital department. It follows that the specialist staff will need to be increased if the benefits of the service are to be extended to cover all rural Maori children in need of it. It is probable that, so far, this service has been examining only one case in three of those known to have ear, nose and throat diseases, and that better results in treatment might have been secured had it been possible to give more supervision.

SECTION 7

UNTREATED EAR, NOSE AND THROAT DISEASE: A NATIONAL ASSESSMENT

This has to take into consideration the amount of disease additional to what is already being treated on the one hand, and the available forces with which to attack it on the other.

It seems fairly certain that a general practitioner, with the aid of a nurse at school and the help of a specialist, can cope with three quarters of the ear disease in the children he treats if he is given the facilities and if he is interested enough.* This, nevertheless, leaves a hard core of a quarter of the total which calls for treatment by a consultant and necessitates beds in a major hospital for intensive therapy. Consultants may be regarded therefore as the keys to the problem and their disposition throughout New Zealand must be accepted and other factors made to conform if possible. With this in mind, hospitals have been grouped as shown in Appendix XII, each group containing one or more specialists and one or more major hospitals.

In 1963 the number of rural Maori children (4,886) in the Waikato Hospital Board district for whom service was necessary was approximately one seventh of the total Maori population of that district as at census date 18th April 1961. It has of course only been assumed that the rural/urban Maori ratio is the same in other hospital board areas and this may be far from true: Appendix XII is therefore no more than a suggested method of regional grouping if a national attack on the problem is contemplated. The numbers are potential, not actual patients, to which can be applied the incidence figures for various conditions.

* J.H. Seddon, 1962, N.Z. Med. Journal, Vol. 61 No. 358, p. 316.

SECTION 8

SUBJECTS NEEDING FURTHER INVESTIGATION

Further investigation into the following subjects is considered necessary. Some are purely public health problems; others could be dealt with by general practitioners, while some need specialist investigation. Central correlation between the three groups is obviously advisable.

8.1 Bacteriology: the nasal flora of Maori and Pakeha children in health and disease

This could best be done by a comparison between bacteriological cultures from the noses of the two races at schools in certain selected rural areas and would need to be accompanied by a simultaneous ear, nose and throat examination. Insufficient work has been done on the "normal" nasal flora of New Zealand children to be sure of the significance of some of the results of this survey. There is a strong suggestion that an abnormal degree of nasal infection combined with over-crowding of dwellings may be a potent factor in the apparent frequency of ear infections in the children of the more primitive areas.

8.2 Iron deficiency anaemia

A considerable amount of investigation is being done or has already been carried out, into iron deficiency anaemia and other ills of the Maori child. This has necessitated dietetic and environmental studies and on one occasion at least the present ear, nose and throat survey benefited greatly from the opportunity of co-operating in this work. It is hoped that continued encouragement will be given such studies as it is felt the solution of the"Maori ear, nose and throat problem" lies to a considerable degree in the improvement of the general health and environment of the children.

8.3 Hot pools and swimming baths

In the past hot pools in the thermal areas have had an evil reputation in causing or spreading ear, nose and throat diseases in Maori children bathing in them. Bathing in any confined area may spread one's own infections and occasion picking up other people's as well; hot pools provide the added risk of what is,afterall, a strong irritant chemical solution, entering the middle ear through any perforation that may exist in the drum. This problem is really part of a far larger one - the possibility of aggravating existing ear, nose and throat disease, or the origination of it, by swimming in school baths or by swimming anywhere for that matter. It is very necessary that all children should be taught to swim, but it is also necessary to ensure that ear, nose and throat diseases are neither aggravated nor irritated thereby. Only too frequently the service "cures" an ear, nose and throat infection which immediately recurs with the advent of the swimming season.

8.4 Surgery

There are certain technical matters concerning reconstructive surgery of the middle ear and other ear operations which are generally accepted by otologists as being correct in their application to a European population. Because of a different health standard or some other incompletely understood reason, the results of surgical treatment in the Maori are apt to be inferior to those obtained in the Pakeha by means of similar surgery - at least they have been so in the past. Otologists working in areas where there is a large Maori population should be encouraged to make differential studies of the effect of similar treatments for the same condition in the two races. If there is a difference in the end result that still defies explanation, then adequate research should be directed accordingly.

8.5 Local therapy

In this Maori ear, nose and throat service the prescribing of local treatments has been governed by the necessity of keeping to those which can be used with safety by the parents, the nurse, or perhaps by some responsible person at school. Little help will come from the study of the results of daily treatment given by a trained staff in city hospitals.

The different circumstances met with in this area in particular will necessitate a comparative study of treatments to find those most applicable to a scattered rural Maori community. Lack of time and staff have prevented any but the most rudimentary therapeutic trials so far.

The above list is by no means a comprehensive one and applies specifically to the practical treatment of the rural Maori school child rather than to academic research in otology. Because of lack of time there is no prospect of these and other subjects receiving the investigation they merit by the Maori ear, nose and throat service as it is constituted at present.

SECTION 9
SUMMARY

9.1 Inadequacy of present available treatment

Approximately one third (4,886) of the 12,887 Maori school children of the Waikato Hospital Board's district live in areas so rural that they have no chance of adequate attention for their ear, nose and throat diseases through any existing medical service. This pilot survey examined 585 children of those referred by medical officers from school examinations. Already enough is known of 357 children for their records to be of statistical significance and these are discussed in the report. The salient point is that slightly under 2% of the whole schoolchild population (i.e. about 250 children) are estimated to be suffering from disabilities sufficient to affect their schooling to some degree and which at a later stage may affect their employability. Twelve and a half per cent of the total child population appear to have a disability causing them to be referred for treatment. The commonest diseases found are recurrent suppurative ear conditions. Results of treatment are of little significance for it has so often been impossible to carry out the surgery recommended because of lack of staff and surgical beds. For example, in the period of the survey between February 1st 1962 and October 31st 1963 surgical treatment which could not be carried out was recommended in 101 instances.

9.2 Description of the Board's district

There is a description of the geographical characteristics of various parts of the Board's district along with a description of the Maori population and the available medical services.

9.3 Recommendations for an attack on ear, nose and throat diseases - Waikato Hospital Board district

It is considered that the problem will not diminish spontaneously and that an attack along the following lines would meet with a worthwhile degree of success. It is therefore recommended that consideration be given to

(a) A continuation of that liaison which has existed during the survey between the Department of Health, the Education Department and the Waikato Hospital Board.

(b) Some increase in the specialist medical staff of the latter.

(c) The incorporation into the service of local medical practitioners in some areas and the utilization of the clinical help that medical officers of the Department of Health could give in others.

(d) The correlation of the above into a combined service for the specific purpose of treating ear, nose and throat disease in Maori schoolchildren of the Waikato.

(e) The continuation of the valuable work already done by officers of the Health Department in the prevention of disease, and the improvement of general hygiene, for it is most important to attack these diseases as far as possible at their source. It is felt that the inclusion of the local otologist would greatly help the work of any local health committee that might be instituted in the district.

9.4 A national attack on ear, nose and throat diseases

To demonstrate the possibility of a national attack on ear, nose and throat disease, the Maori population of other hospital boards conveniently grouped has been given according to the latest figures (1961). To ensure a satisfactory service it would be necessary for each group to be built round the available ear, nose and throat surgeons and each of these suggested groups contains at least one.

9.5 Further investigation

Research is considered necessary in some subjects and these are listed.

9.6 References

Some subjects, of interest to otologists only, are included along with references that should be helpful to anyone wishing to compare the findings of this survey with those of others.

ACKNOWLEDGEMENTS

First of all I should like to acknowledge the help and interest of the late Director-General of Health - Dr. H.B. Turbott. His special interest in Maori matters commenced many years ago when as a Medical Officer of Health he had a great deal to do with the Maori and Maori health surveys, and he has never lost this interest.

The survey was very fortunate in having its administrative way made smooth for it by Mr. A.C. Miller, Deputy Director, Division of Public Health and Otologist-in-charge, National Audiology Centre. We gladly drew on his store of knowledge of the very problems being investigated and at every stage of the survey he gave us that help without which we might well have withered away.

Without the active help of Dr. J.F. Dawson, Medical Officer of Health, Hamilton, and Dr. W.C. Davidson, Rotorua, together with their respective staffs, there could have been no survey at all. I have profited much by their advice, and for this and many other kindnesses I thank them.

The Waikato Hospital Board, through its chairman, Mr. E.G. Guy, its late Superintendent-in-chief, Mr. R.S.A. Graham, and its present Superintendent-in-chief, Dr. J. A. Meade, jointly sponsored this survey with the Services for the Deaf Committee of the Board of Health. They willingly gave me the help that I needed and I am very grateful to them all.

The major part of the onerous clinical work at the Waikato Hospital necessitated by this survey and its recording was done by my colleague, Dr. Marien A.L. Miller, E.N.T. Specialist, Waikato Hospital, who also dealt with all the clinical work in the Rotorua area. I gratefully acknowledge her very large contribution to the medical aspects of this survey.

Without the specialised help of Mr. R.J. Rose, Medical Statistician, Department of Health, and members of his staff it would have proved impossible to record results that would be in any way significant for practical use. I have received the greatest of help from this Branch at all stages of the survey, and I would like to record my appreciation of this.

The photographs illustrating the work of the survey are from the photographic department of the Waikato Hospital and I must thank Mr. G.C. Lelieveld, the Board's photographer, for the trouble he has taken over them and for their excellent pictorial quality.

There is one further acknowledgement to be made. The thanks of us all should go to some hundreds of Maori children of this district and to their parents. One could go a long way before finding another group of children who would behave as well in surroundings that must have been very strange and frightening to them. It has been a great pleasure to us to have had the chance of doing something for them.

H.-M.S. 12

APPENDIX I

WAIKATO HOSPITAL BOARD AND DEPARTMENT OF HEALTH

MAORI E.N.T. SURVEY - NOTIFICATION AND REFERENCE FORM

Instructions: To be completed in triplicate and copies forwarded to Medical Officer of Health - Hamilton or Rotorua according to district.

Punch Column		Code No. (Leave Blank).
	School: ..... Date case referred: ..../.../..... Referred by .....School. M.O., 1. P.H. Nurse, 2. Pte. Pract., 3.	
	Name: ..... Surname Christian names. Sex (write M or F) : ..... Address: ..... Age (last birthday): .....years	
	SYMPTOMS - Referred because of: Deafness, 1. Deafness and discharge, 2. Discharge, 3. Other (state): .....4. At what age did E.N.T. symptoms start? .....years If referred for deafness or discharge state whether - Acute (history of days) ... ... 1 Chronic (continuous for six weeks or more)... ... ... 2 Recurrent 3	
	PREVIOUS TREATMENT - Has child been seen previously by a doctor? Yes, 1. No, 2. If yes, how long ago? .....months Treatment used: ..... Result of above treatment: Improved, 1. Unimproved, 2.	
	SUSPECTED AGGRAVATING FACTORS - Is child undernourished? Yes, 1. No, 2. Has child a history of bronchitis or pneumonia? Yes, 1. No, 2. Has child suffered from pyogenic skin disease? Yes, 1. No, 2. Is child anaemic? Yes, 1. No, 2. Don't know, 3. Is child a T.B. contact? Yes, 1. No, 2. Don't know, 3. Is child a mouth breather? Yes, 1. No, 2. Don't know, 3. Was child breast fed? Yes, 1. No, 2. Don't know, 3. If breast fed, for how long? .....months. What is the hygiene of the home? Good, 1. Fair, 2. Bad, 3.	
	SCHOOL ATTENDANCE - How many school days were lost in last 12 months from E.N.T. disease .....days.	

Note - Where appropriate indicate reply by circling code number applicable

PRIVATE DOCTOR

APPENDIX II H.-M.S.13

WAIKATO HOSPITAL BOARD AND DEPARTMENT OF HEALTH

MAORI E.N.T. SURVEY - SPECIALIST EXAMINATION FORM

Date of Examination

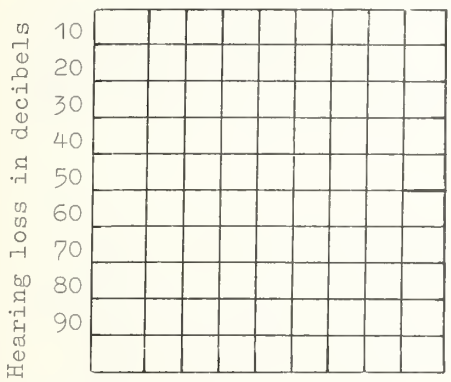
Code No. (Leave Blank).

Name: .....
Surname. Christian names.

Address: .....

Hospital No. ...../..... Date discharged .....

DIAGNOSIS



Condition	R	L	Both Ears
Otitis externa			
Otitis externa and media			
Otitis media:			
Acute suppurative			
Chronic suppurative			
Recurrent suppurative			
Acute catarrhal			
Chronic catarrhal			
Recurrent catarrhal			

Site of perforation if present - Central, 1. Marginal, 2. Attic, 3.

Other condition (state): ....4.

HEARING LOSS -

Overall percentage loss for speech frequencies .....
(or) QCV both ears together: Normal result, 1. Normal to 20 ft., 2. Twenty ft. to 3 ft., 3.

MASTOID X-RAY - Normal, 1. Abnormal, 2. Not done, 3.

MAIN CAUSAL ORGANISM (from swab) - EAR / NOSE

Nose: Clean, 1. Infected, 2.
Teeth: Good, 1. Need attention, 2.
Tonsils: Normal, 1. Infected or enlarged, 2. Absent, 3.
Adenoids: Causing symptoms, 1. No symptoms, 2. Absent, 3.
Cervical glands: Palpable, 1. Not palpable, 2.
Pyogenic skin infection of head and neck: Yes, 1. No, 2.
Sinus X-ray: Normal, 1. Abnormal, 2. Not done, 3.
Anaemia below W.H.S.: Yes, 1. No, 2. ..... G. %

TREATMENT -

Conservative (Toilet, 1. Drops, 2. Powder, 3.
(Other(state): .....4.

Operative (T's and A's, 1. Mastoid, 2. A.W.O., 3.
(Other (state): .....4.

Condition on completion of treatment: Cured, 1. Relieved, 2. Unrelieved, 3.

SCHOOL HEARING GRADE - I IIA IIB III

ECONOMIC PROGNOSIS: NATURE AND DEGREE OF DISABILITY

Note-Where appropriate indicate reply by circling code number applicable

APPENDIX III

A NOTE ON RUATAHUNA AND THE TUHOE TRIBE

Reference has been made more than once to the Tuhoe tribe who live in the Ruatahuna Valley and the surrounding parts of the Urewera district. A description of this valley and of its people is of some interest even in a very condensed form, for much that has been seen there in the past will disappear and be forgotten, while the stage for future events is being set there today. This could be said of many other areas of Maori occupation and to that degree the picture drawn here would be true of them as well.

This valley lies in the heart of the Urewera district of the North Island and although it is traversed by the Rotorua-Waikaremoana main highway, the traveller sees little but one mist enshrouded,bush covered range after the other and steep sided, dark, narrow valleys. It is appropriate that the mythical origin of the Tuhoe who inhabit these valleys should be given as the union of Hine-Wai, the mist-maiden, with Te Maunga, the mountain (early descriptions of this country and of its people are contained in Elsdon Best's "Children of the Mist" and "Tuhoe"). The more sceptical of the valley's 500 inhabitants will ascribe their origin to the intermixture of an aboriginal race that came to New Zealand nine centuries ago with some of the voyagers on the Mataatua canoe 400 years later.

These early settlers had a hard life in the mountain valleys approximately 1,400 feet above sea level where the light sandy soil, the hard climate, and the paucity of eels in the upper reaches of the Whakatane river threw them back on forest products for existence. Birds, roots, berries and rats were their fare till Captain Cook introduced the pig. Their ancestor Toi-Kai-Rakau (the wood eater) was therefore very appropriately named. Not for them were the pipis of the warm sea beaches and the "agricultural" products of the rich lands of the Bay of Plenty.

They were a poor tribe by Maori standards and never very numerous (there are at present approximately 1,600 Tuhoe) as their land was unsuitable for Maori agriculture and they mixed comparatively little with surrounding tribes. After the introduction of muskets in Maori warfare it became vital to secure an adequate supply of them for defence purposes if a tribe were to survive. The production of flax fibre or some similar article of barter for these muskets became a common and necessary tribal occupation. The Tuhoe, having no flax, could use for barter only canoes, manufactured locally from their fine timber and paddled to the coast down the Whakatane river, or else slaves. The latter were acquired from the raiding of surrounding tribes and were exchanged for muskets at what is now Thames at the rate of five slaves for one musket. The necessity for the Tuhoe's acquiring modern weapons was probably brought home to them when the Ngapuhi chief Pomare made his first raid on them in 1822. They remained, therefore, a small tribe sometimes referred to, behind their backs, as "the rat eaters".

Civilization came to them in 1847 when the Rev. G. Preece opened a mission at Te Whaiti. At a later date the Tuhoe had a not absolutely welcome visit from the Maori rebel Te Kooti and his powerful band of Hauhaus. Their lands were traversed by parties of Pakeha soldiers and Maori warriors during the Hauhau rebellion and a guerilla warfare lasted there till peace was declared at Ruatoki in 1870. The mists then descended over Tuhoe-land till 1895 when a road was commenced from Fort Galatea into the area and the benefits and some of the curses of civilization were brought there in much the same way as General Wade, through road making, civilized the Scottish Highlands.

Although this area has been one of the last to acquire a European-type civilization the impact of this has already been considerable. Even in 1936 when two investigators journeyed on pack horse to Maungapohatu in the centre of the district for the purpose of studying dental decay, it was found that "white flour, sugar and oatmeal had preceded them"*. Nevertheless, even today the people of the Ruatahuna Valley are living in circumstances more primitive than most Maori people and it was for that reason that they were chosen for study by a medical research team in January 1960**.

A summary of the economic conditions of this valley shows the problem that they, and we also, have to face. Their main asset is directly or indirectly connected with the timber of the district; this is a diminishing source of revenue and, as mentioned, very little farming can take place because of the nature of the land. The valley contains approximately 500 people, 242 of whom are of school age or below. These children will probably be unable to secure employment locally and the future that they themselves hope for is some nebulous factory job in Rotorua. Whether they finally get a job there or elsewhere, the point is that they must leave their own homes at an early age and thus run the risks of the attendant evils of city life before they are prepared for them - one of the worst features of this apparently unavoidable urban drift.

* "The Maori People Today" (Sutherland) 1940. New Zealand Institute of International Affairs and New Zealand Council for Educational Research.

** "A Health Survey in a Rural Maori Community", Prior, I. 1962, N.Z. Med. Journal, Vol. 61 No. 359, p. 333.

APPENDIX IV

WAIKATO AREA - MAORI SCHOOLCHILDREN IN EACH PUBLIC HEALTH NURSE'S AREA FOR WHOM A SPECIAL SERVICE WILL BE NECESSARY IN RURAL AREAS

Public health nurse's area	Number of Maori children at school, 1961	"Rural" children with probable insufficient service	Number of schools from which these rural children were drawn
Benneydale	227	227	4
Cambridge	262	159	3
Fairfield	349	38	1
Hamilton East	129	.	.
Hamilton North	274	47	1
Hamilton West	244	110	1
Hamilton South	421	44	3
Huntly	487	252	5
Kawhia	255	175	6
Kihikihi	261	144	5
Matamata	283	159	3
Morrinsville	222	47	3
Ngaruawahia	573	86	2
Onewhero	241	236	7
Otorohanga	419	59	2
Pio Pio	240	93	2
Putaruru	403	93	4
Raglan	230	141	5
Te Awamutu	342	104	3
Te Aroha	187	64	2
Te Kauwhata	307	208	5
Te Kuiti	657	192	6
Tokoroa	518	175	1
Total 23 areas	7,531 children at 242 schools	2,853 between (where special service appears necessary)	74

APPENDIX V

ROTORUA AREA - MAORI SCHOOLCHILDREN FOR WHOM A SPECIAL SERVICE WILL BE NECESSARY IN RURAL AREAS

(1961 figures)

Urban	Number of children	Rural	Number of children
Whakarewarewa	254	Rotokawa	280
Rotorua Primary	330	Rotoiti	140
Mangakino Primary	240	Whangamarino	240
St. Joseph's (Mangakino)	50	Wharepaina	100
St. Mary's Convent (Rotorua)	115	Horohoro	120
Ngongotaha	240	Waitahanui	58
Taupo Primary	230	Te Whaiti	70
Wairakei	100	Huiarau	124
Waipahihi (Taupo)	50	Mokai	41
Murupara Primary	258	Tokaanu	176
Tauwhiuau (Murupara)	263	Tauranga-Taupo	111
		Waihi Convent	73
		Atiamuri	130
Glenholme (Rotorua)	69	Rotoma	8*
Otonga Rd. (Rotorua)	60	Waiotapu	24
Malfroy Rd. Intermediate	144	Reporoa	12
Malfroy Primary	184	Broadlands	6*
Sunset Rd. Intermediate (Rotorua)	180	Mihi	6*
Lynmore (Rotorua)	75	Rerewhakaaitu	10*
Western Heights (Rotorua)	140	Waikite Valley	8*
St. Michael's Convent (Rotorua)	123	Tihoi	36
Tauhara (Taupo)	180	Whakamaru	17
		Mamaku	53
		Kaingaroa	98
		Minginui Forest	78
		Minginui Maori	17
		Iwitahi	6*
		Pohukura	15
		Galatea	20
TOTAL urban Maori children in 20 schools	3,285	TOTAL rural Maori children in 29 schools, not including 6 small ones*. For these rural children service will be necessary	2,033

APPENDIX VI

SCHOOLS IN ROTORUA-TAUPO AREA FROM WHICH SURVEY GROUPS WERE DRAWN

GROUP 1 A

School	Maori	European	Total roll	Number referred	Number completed 6-monthly check
Whakarewarewa Maori (Rotorua)	254	10	264	41	41
Rotokawa Maori (Rotorua)	280	.	280	26	26
Rotorua Primary	330	336	666	25	25
Rotoiti Maori (Rotorua)	140	.	140	15	15
Mangakino Primary	240	250	490	39	39
Mangakino (St. Joseph's Convent)	50	76	126	12	12
Total Group I A	1,294	672	1,966	158	158

GROUP 1 C

Additional schools in area served by E.N.T. service with 30% Maori children					
St. Mary's Convent (Rotorua)	115	320	435		
Whangamario Maori (Rotorua)	240	.	240		
Ngongotaha (Rotorua)	240	274	514		
Wharepaina Maori (Rotorua)	100	4	104		
Horohoro Maori (Rotorua)	120	.	120		
Taupo Primary	230	400	630		
Wairakei	100	296	396		
Waitahanui Maori (Taupo)	58	.	58		
Waipahihi (Taupo)	50	68	118	55	55
Murupara Primary	258	107	365		
Murupara-Tauwhiuau	263	67	330		
Te Whaiti Maori	70	.	70		
Ruatahuna Maori (Huirau)	124	8	132		
Mokai Maori	41	.	41		
Tokaanu Maori	176	20	196		
Tauranga:Taupo Maori	111	.	111		
Waihi Convent (Tokaanu)	73	10	83		
Atiamuri	130	237	367		
Total Groups I A and I C	3,793	2,483	6,276	213	213

APPENDIX VII

SCHOOLS IN WAIKATO AREA FROM WHICH A SURVEY GROUP WAS DRAWN

District	Total Maoris on roll of schools surveyed: 1961	Number of Maori children examined by medical officers	Number referred to survey as being abnormal	Number fully surveyed by E.N.T. Service
(1)	(2)	(3)	(4)	(5)
Benneydale	227	197	23	10
Cambridge	111	98	18	8
Fairfield	73	72	6	4
Hamilton East	26	26	1	1
Hamilton North	166	69	14	9
Hamilton West	233	199	25	10
Huntly	358	344	44	18
Kawhia	166	150	33	12
Kihikihi	166	149	26	6
Matamata	159	156	29	11
Ngaruawahia	401	385	30	11
Otorohanga	272	227	20	9
Te Awamutu	182	125	23	12
Te Kauwhata	97	84	29	12
Te Kuiti	527	443	40	10
Tokoroa	86	1	1	1
Total	3,250	2,725	362	144

Note: (a) Columns (2) and (3) should theoretically show the same numbers. The difference arises partly from the increase in school rolls in the time interval between the first and the last examination - which might be up to two years.

(b) The difference in figures between columns (4) and (5) is due to the physical difficulty of transport, grouping, etc., which was the only thing that governed the selection of cases.

APPENDIX VIII

B. PROTEUS IN AURAL DISCHARGES AND ITS SIGNIFICANCE

In the survey of 357 children by the clinic B.Proteus appeared on 46 occasions in chronic and recurrent suppurative otitis media - the remaining cases were ones of skin infection. An attempt to indicate the significance of this organism from the prognostic point of view is now made by linking the presence of the organism to the end result as seen at least six months later. During this time the child may have had efficient treatment or may have had none worth while.

End result in 46 children known to have a B.Proteus infection in the aural discharge in cases of chronic suppurative otitis media and recurrent suppurative otitis media:

Disease	Number of children unrelieved	Number of children relieved or cured
Chronic suppurative otitis media	13	11
Recurrent suppurative otitis media	10	12

Two points emerge from these figures:

(a) The presence of this organism does not help to separate recurrent suppurative cases from chronic suppurative cases.

(b) As no major surgery was performed on these children there appears to be a good 50% chance of relief at least by local measures. This is an entirely different outlook from what was generally thought.

APPENDIX IX

Results of treatment - final result in suppurative otitis media only, from a group of 343 children (Groups 1 and 2) referred to specialist clinics for all ear conditions and classed according to domicile

	Urban children		Rural children	
Suppurative disease	Number of urban children referred	Number unrelieved	Number of rural children referred	Number unrelieved
Chronic suppurative otitis media	30	11	29	15
Recurrent suppurative otitis media	112	35	90	21
	142	46	119	36

This table would indicate that extra treatment for the rural child is helping to remove the disability from which he suffered. See further in "Results of Treatment".

APPENDIX X

WAIKATO HOSPITAL BOARD DISTRICT

APPENDIX XI

MAORI PUPILS ATTENDING SCHOOLS DURING 1961 IN THE REMAINDER OF THE ROTORUA-TAUPO HEALTH DISTRICT BUT WHO ARE IN THE BAY OF PLENTY AND THE TAURANGA HOSPITAL BOARD AREAS RESPECTIVELY AND WHO ARE THEREFORE NOT INCLUDED IN THE PRESENT SURVEY

Urban schools	Maori roll	Rural schools	Maori roll
Tauranga Primary	10	Bethlehem	250
Omokoroa Point	.	Te Puna (Board)	59
Pahoia	.	Te Puna (Convent)	80
Mt. Maunganui	19	Omokoroa No. 1	16
Omanu	42	Whakamarama	6
Arataki	82	Katikati	123
Papamoa	119	Matapihi	108
Kaiate Falls	.	Matakana Island (Remote)	117
Maungatapu	115	Motiti (Remote)	17
Te Puke	110	Pongakawa	17
Paengaroa	28	Te Ranga	8
Fairhaven	35	Rangiuru	.
Papamoa (Board)	15	Rotoehu Forest	10
Kawerau South	85	Pukehina	30
Kawerau Central	210	Otamarakau	16
Kawerau North	136	Maketu	80
Taneatua	160	Te Mahoe	160
St. Joseph's Convent	42	Te Teko	412
Allandale	79	Waiohau	83
Edgecumbe	90	Manawahe	3
James St.	50	Ruatoki	188
Convent	22	Tawera	168
Greerton	52	Waimana	127
Green Park	16	Matahi (Remote)	52
Intermediate	28	Kaiangaroa	7
Nerivale	30	Nukuhau	19
Otumoetai	48	Thornton	39
Pillans Point	22	Matata Convent	65
Tauranga South	15	Matata Maori	120
		Otakiri	18
		Awakeri	46
		Poroporo	124
		Paroa	140
		Wainui Road	28
		Ohope	13
		Kaimai	12
		Oropi	9
		Pye's Pa	14
		Tauriko	1
Total urban Maori children	1,660	Total rural Maori children	2,785
		Subtract the rolls of 8 schools with rolls of less than 11	44
		Children for whom service appears necessary among 31 schools	2,741

APPENDIX XII

GROUPING OF HOSPITAL BOARD AREAS EACH HAVING ONE OR MORE E.N.T. SPECIALIASTS AND A MAJOR HOSPITAL AND SHOWING MAORI POPULATION OF EACH GROUP

FIGURES BASED ON THE POPULATION OF HOSPITAL DISTRICTS AS AT CENSUS DATE 18TH APRIL, 1961

Hospital group	Northland	Auckland	Waikato Thames	Tauranga Bay of Plenty Opotiki	Cook Wairoa Hawke's Bay Waipawa	Taumarunui Taranaki Stratford Hawera Patea Wanganui	Palmerston North Wellington Wairarapa	Total
Maori population	21,625	25,228	37,162	18,728	20,313	16,961	13,122	153,139
Estimated number of rural Maori children in an ear, nose and throat service	3,089	3,604	5,309	2,675	2,902	2,423	1,875	21,877
Probable number of patients, being 12% of the above figure	371	432	637	321	348	291	225	2,625

R. E. Owen, Government Printer, Wellington, New Zealand—1965

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